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PART II

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WATER RESOURCES COUNCIL (WRC) PRINCIPLES AND STANDARDS, NATIONAL ENVIRONMENTAL POLICY ACT (NEPA), AND RELATED POLICIES

Guidelines for Conducting Feasibility Studies for Water and Related Land Resources; Final Rules

[3710-92]

Title 33—Navigation and Navigable Waters

CHAPTER II—CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

WATER RESOURCES COUNCIL (WRC) PRINCIPLES AND STANDARDS, NATIONAL ENVIRONMENTAL POLICY ACT (NEPA), AND RELATED POLICIES

Guidelines for Conducting Feasibility Studies for Water and Related Land Resources; Final Rules

AGENCY: Corps of Engineers, DOD.

ACTION: Final rule.

SUMMARY: These seven regulations were first published on November 10, 1975 to establish guidance for conducting Corps of Engineers feasibility studies for water and related land resources, consistent with the substantive planning requirements of the U.S. Water Resources Council (WRC) Principles and Standards (P&S), the National Environmental Policy Act (NEPA), and related policies. These regulations are necessary to comply with the requirements of WRC's Principles and Standards as promulgated and published in the FEDERAL REGISTER, September 10, 1973. The intended effect of these regulations is to guide field offices of the Corps of Engineers in planning for the conservation, development, and management of water and related land resources during the conduct of feasibility studies under jurisdiction of the Chief of Engineers. The revisions made to these regulations were completed prior to the President's Water Policy Message of June 6, 1978. Therefore, none of the revisions are in response to the President's message. These revised regulations will be applied to all on-going and future studies except those for which the final report will be submitted to the Office of the Chief of Engineers or the Board for Rivers and Harbors prior to January 1, 1979. The regulations dated November 25, 1975 will be used for those submitted prior to that date.

EFFECTIVE DATE: January 1, 1979.

FOR FURTHER INFORMATION CONTACT:

Mr. William J. Donovan, Chief, Plan Formulation and Evaluation Branch (DAEN-CWP-P), Office, Chief of Engineers, Washington, D.C. 20314, 202-693-6678.

SUPPLEMENTARY INFORMATION: On November 10, 1975, the Secretary of the Army, acting through the Chief of Engineers, published seven regulations in the FEDERAL REGISTER (33 CFR Part 290, 33 CFR Part 291, 33 CFR Part 292, 33 CFR Part 293, 33 CFR Part 294, 33 CFR Part 295, 33 CFR Part 393) establishing Corps of Engineers guidance for conducting feasibility studies for water and related land resources. A one year period was provided for public comment and Corps of Engineers planning experience. The only comments received, other than those of Corps offices, were from the U.S. Department of the Interior (DOI). These comments were carefully considered in reviewing the regulations for possible revision. Based on the Department of the Interior comments, as well as Corps experience in applying the regulations to feasibility studies, the seven regulations have been revised to clarify the guidance. An analysis of the Department of the Interior comments received and other revisions made to the November 10, 1975 regulations are provided below.

1. As suggested by the Department of the Interior, many additional legislative references could be included in § 290.3 of the regulations. It was decided however, to limit references to only those deemed most pertinent to the Principles and Standards.

2. Definitions of terms in § 290.4 of the text was limited to those having special meanings. Other terms and concepts such as, those suggested by the Department of the Interior, are more appropriately and effectively discussed in the text.

3. Department of the Interior commented that § 290.6 is unclear as to how the Corps views the environment. The discussion of the EQ objective and its relationship to the National Environmental Policy Act and traditional water resources in § 290.6 has been clarified by revised §§ 290.6c and 290.6d.

4. Department of the Interior suggested that related regulations be included in the FEDERAL REGISTER verbatim with these regulations. It is not practical to include every related regulation as part of these regulations. Regulations referenced in § 290.3 and referred to throughout these regulations have previously been published in the FEDERAL REGISTER.

5. Department of the Interior suggested using different futures for different alternative plans. The consideration of alternative futures as stated in § 290.9(a)(5) is essentially at the discretion of the field planner. Sensitivity analysis is required by these regulations. Alternative plans, however, are formulated based on the "most probable future," which the Corps considers a more practicable approach.

6. Department of the Interior suggested that the Corps take a liberal attitude on recommending Corps implementation of projects which fall entirely within the authority of another Federal agency. Corps authority as stated in § 290.11(c)(2) does not relate to specific project authorizations, but rather to broad areas of responsibility such as flood control and navigation. Section 290.6 provides discussion of the policy governing inclusion of various types of measures. The Corps will continue to inform other Federal agencies when studies indicate the best plan contains measures which come under implementation authority of these other agencies, but it has no responsibility for recommending these to Congress.

7. Department of the Interior believes the procedures in §§ 293.7(b) and 295.10 will produce a narrow range of alternative plans. Department of the Interior prefers to develop NED and EQ Plans as a first step. The Corps does not agree with the Department of the Interior. These regulations do provide for the formulation of a broad range of alternative plans and a clear analysis of the trade-offs among those plans.

8. Department of the Interior suggests a revision to the format of the System of Accounts given in Part 393. The format of the System of Accounts shown in Part 393 has been revised by adding appropriate line items rather than additional columns. Department of the Interior's suggestion was considered in the revisions to this format.

9. The Department of the Interior believes § 393.18(a) is not clear. The System of Accounts, Table 2, has been revised for clarification. Meaningful revisions made to these seven regulations in addition to clarifications and editorial corrections are as follows:

1. Definitions for "detailed plans", "intermediate plans", and "reconnaissance report" have been added to § 290.4. The definition of impacts has been clarified in § 290.4 and throughout the text of the seven regulations.

2. Sections 290.6c and 290.6d provide clarification regarding the concept of the environment and on the inclusion of different types of management measures.

3. Stage 1 has been retitled to "Reconnaissance" (see §§ 290.10a and 291.5) so that it is more descriptive of the activities performed during this Stage. The text of §§ 290.10a and 291.5 has also been revised for clarification.

4. The text of §§ 290.10c and 291.7 has been revised to further clarify the activities performed in Stage 3.

5. Section 291.6 has been revised to clarify activities performed in Stage 2.

6. Sections 293.7d(2), 293.7d(3) and 295.10 have been revised to further clarify the definition of an EQ Plan and to provide guidance on what to do if there is no EQ Plan.

7. The System of Accounts in Part 393, Tables 1 and 2, have been revised to better present information developed during a study.

Dated: July 7, 1978.

THOMAS J. WOODALL,
Lieutenant Colonel, CE, Acting Executive Director, Engineer Staff.

33 CFR Parts 290-295 and 393 are revised to read as follows:

PART 290—PLANNING PROCESS: MULTIOBJECTIVE PLANNING FRAMEWORK (ER 1105-2-200)

Sec.
290.1 Purpose.
290.2 Applicability.
290.3 References.
290.4 Definitions.
290.5 Objective of the planning process.
290.6 Basic policies.
290.7 Planning process.
290.8 Essential planning considerations.
290.9 Functional planning tasks.
290.10 Plan development stages.
290.11 Plan selection and recommendation.
290.12 Effective date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

§ 290.1 Purpose.

This regulation establishes guidance for conducting feasibility studies for water and related land resources consistent with the planning requirements of the WRC Principles and Standards (P&S), the National Environmental Policy Act of 1969 (NEPA), and related policies. It establishes a process under which alternative plans are formulated and the resulting economic, social, and environmental impacts assessed and evaluated.

§ 290.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 290.3 References.

(a) Title I, Pub. L. 91-190 (83 Stat. 852), National Environmental Policy Act, January 1, 1970.

(b) Section 122, Pub. L. 91-611 (84 Stat. 1818), River and Harbor and Flood Control Act of 1970, December 31, 1970.

(c) Sections 201, 208, 209, 303, and 404, Pub. L. 92-500 (86 Stat. 816), Federal Water Pollution Control Act Amendments of 1972, November 18, 1972.

(d) Section 73, Pub. L. 93-251 (88 Stat. 12), Water Resources Development Act of 1974, March 7, 1974.

(e) Water Resources Council, Principles and Standards for Planning Water and Related Land Resources (P&S), 38 FR 24778-24869, September 10, 1973.

(f) ER 1105-2-14, Framework and River Basin Study Programs (33 CFR Part 252).

(g) ER 1105-2-50, Continuing Authorities Program (33 CFR Part 263).

(h) ER 1105-2-210, Plan Development Stages (33 CFR Part 291).

(i) ER 1105-2-220, Problem Identification (33 CFR Part 292).

(j) ER 1105-2-230, Formulation of Alternatives (33 CFR Part 293).

(k) ER 1105-2-240, Impact Assessment (33 CFR Part 294).

(l) ER 1105-2-250, Evaluation (33 CFR Part 295).

(m) ER 1105-2-507, Environmental Impact Statements (33 CFR Part 209.410).

(n) ER 1105-2-800, Public Involvement: General Policies (33 CFR Part 380).

(o) ER 1105-2-921, System of Accounts (33 CFR Part 393).

§ 290.4 Definitions.

(a) "Alternative plans" are different ways for managing water and related land resources employing structural and/or non-structural measures.

(b) "Base condition" is the existing economic, social, and environmental characteristics of the area under study.

(c) "Detailed plans" are water resources plans for which sufficient feasibility investigations have been conducted for the evaluation and selection of a plan for implementation, and with limited additional information, the selected plan can be recommended to Congress for implementation authorization if certain conditions are met.

(d) "Evaluation" is the process of analyzing plans against the "without condition" and against each other to determine and compare their beneficial and adverse contributions.

(e) "Impacts" (effects) are the economic, social, and environmental consequences expected to result from alternative plans. The impacts of a plan are the differences between the "with condition" and the "without condition."

(f) "Implementable plans" are plans which can be transformed from concept to reality. This requires consideration of institutional and technological feasibility, and acceptability to some segment of the affected public.

(g) "Intermediate plans" are water resources plans for which sufficient preliminary feasibility investigations have been conducted to screen alternatives and to select the most appropriate ones for development of detailed plans.

(h) "Most Probable future" is the projection of basic demographic, economic, social and environmental parameters, which is used as the basis for defining the "without condition" and the planning objectives for a particular study.

(i) "Measure" is any structural or nonstructural means of resource management, and may be part of a plan or the entire plan.

(j) "Planning objectives" are the national, state, and local water and related land resource management needs (opportunities and problems) specific to a given study area that can be addressed to enhance National Economic Development or Environmental Quality.

(k) "Planning process" is a systematic approach to analyzing needs and problems, establishing planning objectives, and developing and evaluating alternative resource management plans.

(l) "Reconnaissance report" is a document prepared to reflect the results of Stage 1 planning for the purpose of deciding whether additional studies are warranted, and if so, to identify: the appropriate scope of study, the level of detail required to formulate intermediate plans, significant policy issues or large potential Federal investment decisions, and to update management information for Stage 2 of the study.

(m) "Resource management" involves the development, conservation, enhancement, preservation, or maintenance of water and related land resources to achieve the goals of society expressed nationally and locally.

(n) "Without condition" is the detailed specification of the conditions (that are broadly described for the most probable future) which will prevail over the planning period in the absence of implementation of a plan to alter the management of water and related land resources. The description of the "without condition" covers all categories of impacts which are significant to the evaluation of alternative plans.

§ 290.5. Objective of the planning process.

The objective of the multiobjective planning framework is to guide planning for the conservation, development, and management of water and related land resources. The framework requires the systematic preparation and evaluation of alternative ways of addressing problems, needs, concerns, and opportunities under the P&S objectives of National Economic Development (NED) and Environmental Quality (EQ). This results in information necessary to make effective choices regarding resource management under existing and projected conditions. Alternative plans are to be formulated without bias to structural or nonstructural measures. The appendixes and references, particularly § 290.3 (a) and (e), must be utilized for a full understanding and application of the multiobjective planning framework.

§ 290.6. Basic policies.

Corps policy on multiobjective planning is largely derived from several

legislative and executive authorities, referenced in § 290.3. In major part, NEPA, P&S, and the other cited authorities establish and define the national objectives for water resource planning, specify the range of impacts that must be assessed, and set forth the conditions and criteria which must be applied when evaluating plans.

(a) The P&S require that Federal and federally assisted water and related land planning be directed to achieve National Economic Development (NED) and Environmental Quality (EQ) as equal national objectives. NED is to be achieved by increasing the value of the nation's output of goods and services and improving national economic efficiency; EQ is to be achieved by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

(b) The term "planning objectives" refers to water and related land resource management needs that are specific to each study. They are derived from analysis of the needs (opportunities and problems) of the study area that can be addressed to enhance the national objectives of P&S.

(c) The national objectives and accounts encompassed by the P&S are interpreted as being consistent with and reflective of the concept of total environment set forth in the National Environmental Policy Act of 1969 (NEPA). Thus, systematic, interdisciplinary planning, assessment, and evaluation conducted in compliance with the P&S should address a broad range of concerns, including those related to the natural, cultural, and human environment and be, simultaneously, responsive to the substantive requirements of NEPA. Procedural requirements for preparation of an EIS are in § 209.410 of this chapter.

(d) All alternative plans carried through the planning process need not include only measures addressing a primary Corps mission or study resolution purpose. However, if an alternative plan that does not address a primary Corps mission is carried through the planning process, that plan must clearly present an alternative use (trade-off) of the resource under consideration. Decisions to study and include plans that contain non-Corps measures addressing unrelated resources shall be surfaced and addressed in the Intensive Management Program. If it becomes apparent in the course of a study that an economically justified plan to satisfy traditional water resource needs cannot be formulated, continued formulation of an EQ Plan or other alternative plans is not warranted.

(e) Alternative plans formulated during a study must take into consideration the requirements for recommending plan implementation such as cost sharing, the relationship of benefits to costs, and Corps authority. (See paragraph 11, below.)

(1) Cost sharing and repayment requirements are not established by the P&S. Moreover, the P&S do not provide a basis for departures from established cost sharing policies. Thus, pending development of new national policies, cost of Corps proposals will be shared in accordance with specific policies now established for specific project purposes or by reasonable analogy thereto.

(2) In the evaluation of benefits and costs, if it becomes apparent in the course of a study that an economically justified plan to satisfy traditional water resource needs cannot be formulated, continued formulation of an EQ Plan or other alternative is not warranted.

(f) P&S also requires that the impacts of a proposed action be measured and the results displayed or accounted for in terms of contributions to four accounts: National Economic Development (NED), Environmental Quality (EQ), Regional Development (RD), and Social Well-Being (SWB).

(1) Contributions to the NED and EQ accounts are the overall beneficial and adverse impacts of the proposed action on the components of the national objectives of P&S.

(2) Contributions to the RD account are determined by establishing a proposal's effects on a region's income, employment, population, economic base, environment, and social development.

(3) Contributions to the SWB account are determined by establishing a proposal's effects on real income, security of life, health and safety, education, cultural and recreational opportunities, emergency preparedness, and other factors.

(g) In addition to P&S, the National Environmental Policy Act of 1969 and the River and Harbor and Flood Control Act of 1970 require assessment of plan impacts. Section 122 of the 1970 Act specifies those impacts that, as a minimum, must be assessed for any proposed action, while section 102(2)(c), of NEPA requires that the environmental impacts of any proposed action be fully assessed.

(h) The Federal Water Pollution Control Act Amendments of 1972 links water quality concerns to the more traditional aspects of resouce management planning. Among other things, the Act, in sections 201, 208, 209, and 303, places substantial emphasis on planning problems falling within the broad scope of P&S while section 404 requires specific considerations in the planning of Corps and other projects which discharge dredged or fill material into waters of the United States.

§ 290.7 Planning process.

A representation of the planning process is provided as figure 1.

(a) Achievement of the planning process objective defined in § 290.5 requires the application of several essential planning considerations which are discussed more fully in § 290.8.

(b) The four functional planning tasks of problem identification, formulation of alternatives, impact assessment, and evaluation, will be performed throughout a study. These planning tasks are explained in § 290.9 and other regulations in parts 290–295 of this chapter.

(c) Plans will be developed in three separate stages: reconnaissance level; intermediate plans; and detailed plans. These stages are explained in § 290.10 and 291 of this chapter.

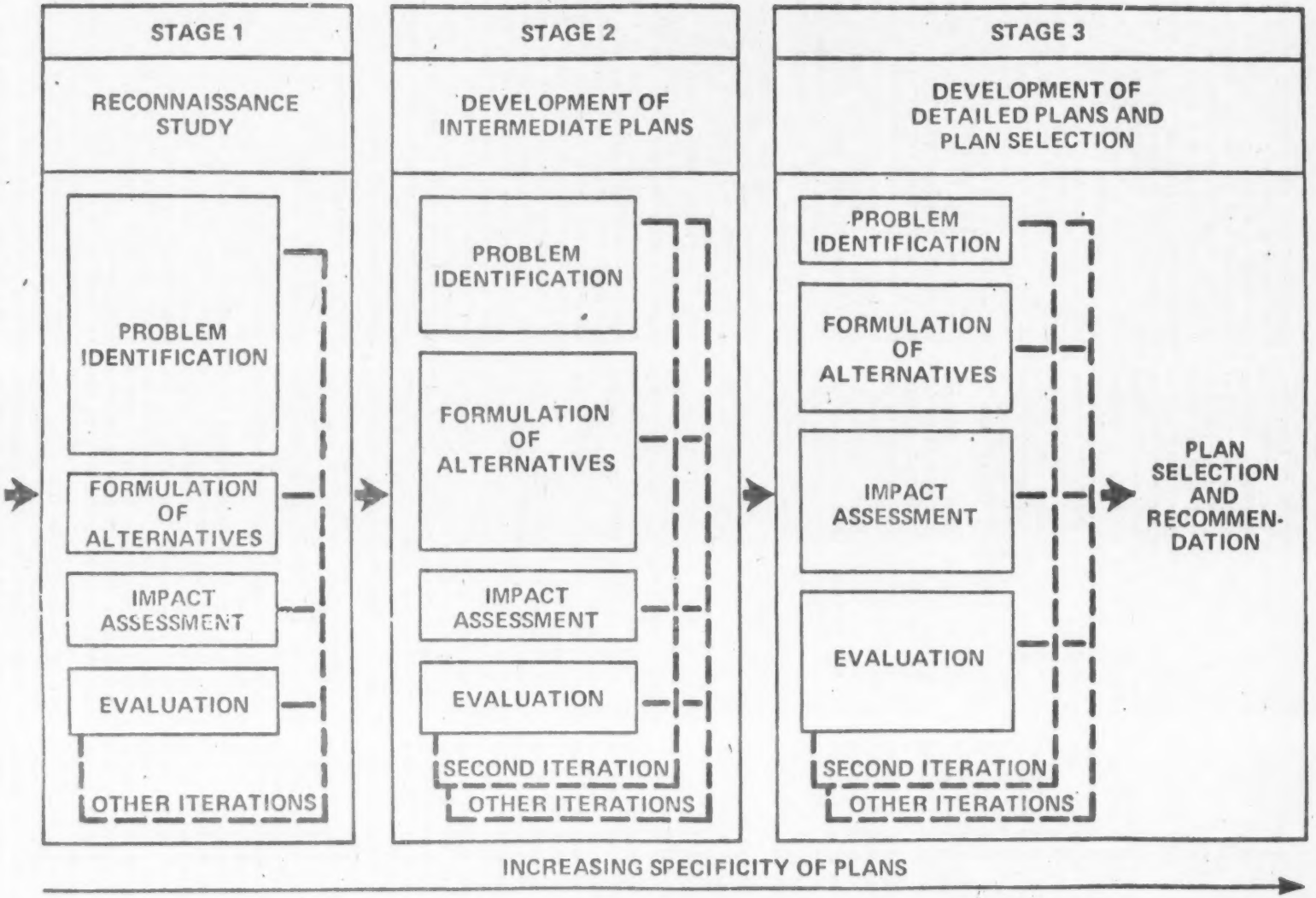

FIGURE 1: GENERAL RELATIONSHIP OF PLAN DEVELOPMENT STAGES AND FUNCTIONAL PLANNING TASKS

§ 290.8. Essential planning considerations.

A number of essential considerations are requisite to successful planning: The interdisciplinary character of the planning team, planning flexibility, implementability of the detailed plans, institutional analysis, and public involvement. Public involvement is discussed in part 380 of this chapter; the others are discussed in § 290.8 of this section.

(a) *Interdisciplinary planning.* The requirements of the P&S, NEPA, and section 122, among others, necessitate an interdisciplinary planning approach to identify and define planning objectives, develop creative alternative plans, and analyze a broad range of complex issues, including the likely economic, social, and environmental consequences of plan implementation. This is best accomplished by a planning team which employs a diversity of professional skills.

(1) The interdisciplinary approach will be utilized throughout a study. This does not mean that all participants must be involved in each activity, task, or stage, only that they must be involved when their skills could have a material effect on study progress and output.

(2) The role of the study managers is pivotal to the successful accomplishment of interdisciplinary planning since they are responsible for coordinating and synthesizing the efforts of all involved.

(3) To the extent appropriate, consultants, members of citizen groups, representatives of other government agencies, and other segments of the public should also be included as a part of the planning team to draw from a wider variety of sources and provide different perspectives on the study and its direction.

(b) *Flexibility.* Flexibility is obtained when each stage of the planning process, embracing problem identification, formulation of alternatives, impact assessment, and evaluation is repeated one or more times as necessary. In this manner, additional or increasingly precise information is introduced to guide the formulation and evaluation of alternative plans. Where conditions change significantly during the course of a study, subsequent iterations of the planning tasks can be altered to reflect and accommodate such change. Thus, the planner is provided a systematic, highly flexible means for taking the preliminary assumptions and data identified in Stage 1 and translating them into the more precise and detailed plans displayed at the completion of Stage 3. Figure 1 outlines the general relationships among the three plan development stages and the four functional planning tasks and suggests how the emphasis on the various tasks is likely to change as a study progresses.

(c) *Implementability.* The detailed plans presented at the conclusion of the planning process are to be management actions capable of being implemented based on their institutional and technological feasibility, and on their acceptability to some segment of the affected public. Public involvement and institutional analysis shall be conducted throughout the study to aid in developing implementable plans. The alternatives presented at the end of Stage 3 must be fully developed with their appropriate management measures specified. Resource requirements, size and location, and resultant outputs of each detailed plan should be specified. Public and private sector expenditures or actions necessary to implement each plan should also be identified.

(d) *Institutional analysis.* Analysis of institutions is one means of assessing the feasibility of alternative plans. As plans increasingly responsive to the planning objectives are developed, a parallel, yet related effort must be carried out to assure plan implementability. Analysis is made to determine the institutional requirements imposed by alternative plans and the capability of existing institutions to meet those requirements. The scope and depth of an institutional analysis will be dependent on the study it addresses. A study of fairly traditional dimensions, in which the recommendations are likely to be within the Corps authority to implement, is likely to require less effort and analysis than one of a more comprehensive or unusual nature in which unique implementation arrangements may be required.

(1) *Institutions.* An institution is an organization or political/social process that is generally structured, systematized, and stable. It may be a formal or informal body, group, or agency as well as one or a set of formalized practices, procedures, customs, or traditions. Political and social institutions play an essential role in the planning process, in that they can be critical determinants regarding implementability. Institutions are diverse and wide ranging. State governments, bi-state agencies, local planning agencies, established tax structures, and general attitudes toward financial obligation are examples.

(2) *Procedure for institutional analysis.* Institutional analysis starts with a preliminary survey of existing institutions relevant to the problems addressed by the study. This requires becoming acquainted with the political character of the area and identifying any widespread attitudes or local customs regarding the management or use of resources. As the study progresses, institutional base information is refined and expanded. Financing capabilities, legal authorities, programs, and policies are described with increasing precision. Simultaneously, the views and desires of potential project sponsors must be fully considered and integrated into the planning process. The result should be a clear picture of how various alternatives could be implemented and by whom, indicating both the capabilities of different institutions with respect to a total plan or components thereof, as well as possible constraints or impediments, existing or potential, to implementation.

(3) *Relation to public involvement.* An early and active program of public involvement (see 33 CFR part 380) and interagency coordination is essential to successful institutional analysis and to plan recommendations and implementation. Appropriate organizations and agencies and other publics should be active participants in the planning process early in Stage 1 rather than viewed as outsiders who must subsequently be convinced of the worth of a plan and its implementation. Early participation and coordination may preclude or minimize later conflict or confrontation that could negate the validity of a plan that is otherwise economically, socially, and environmentally acceptable.

(4) *Implementation arrangements.* The analysis will specify how, when, and by whom each plan may be implemented. The most socially and politically acceptable means available for the implementation of a recommended plan, including proposals for new organizations or financing methods or new roles for existing institutions will be specified. The Corps or a number of other Federal, state, regional, or local entities may implement a plan. Lack of an existing capability for carrying out a plan, or component thereof, will not preclude the development of that plan or component provided that a realistic recommendation for a new implementating mechanism can be made. The rationale used to achieve the recommended implementation arrangements should be clearly and concisely incorporated in the report.

§ 290.9. Functional planning tasks.

Four functional planning tasks, each composed of specific activities, are to be carried out during each stage of the planning process. While emphasis may be on a particular activity at a given point in the process, successful accomplishment of each task, as well as the planning process in general, requires continuous integration of all activities. Each activity should reflect the result of previous activities and should complement the other activities required to carry out the study. The four planning tasks and their associated activities are described below and are discussed more fully in parts 292 through 295 of this chapter.

(a) *Problem identification—Task 1.* Problem identification is the determi-

nation of the range of water and related land resource problems a study will address. It provides for establishing planning objectives which give direction to subsequent planning tasks. It is carried out by identifying resource management problems and public concerns, analyzing them to determine the physical area to be studied, surveying existing and projected resource conditions in the area, and synthesizing this information into specific planning objectives. Activities to be carried out in problem identification are as follows:

(1) *Identify public concerns.* This activity identifies the range of economic, social, and environmental concerns that form the basis for detailing specific water and related land resource management problems to be addressed in the study. The general public, interest groups, and government agencies will be consulted to obtain their views regarding what the study should address.

(2) *Analyze resource management problems.* Based on requirements contained in national policies and the study authority, public concerns should be analyzed to more specifically determine the range of water and related land resource management problems to be addressed. The full complement of issues, concerns, needs, constraints, opportunities, and desires expressed by the public in relation to the study area resources are to be considered.

(3) *Define the study area.* The range of identified resource management problems should be examined as a basis for defining the geographic area to be studied. Depending upon the character and range of resource management problems to be studied, the study area boundaries may be expanded beyond those described in the study authority.

(4) *Describe the base condition.* The study area should be described in terms of its existing water and land uses, as well as its economic, social, and environmental characteristics. The description should summarize existing conditions in the study area and verify actual potential resource management problems.

(5) *Project future conditions.* Drawing on the public concerns regarding existing and future problems and opportunities in the study area, including a thorough analysis of the base condition, a number of reasonable alternative future conditions should be projected. A range of those conditions which reflect alternative assumptions about the future will be presented to the public. From this range of alternative futures, the one that best reflects the constraints imposed by the economic, social, environmental, and political systems, will serve as the basis for projecting future conditions and will represent the "most probable future."

(6) *Establish planning objectives.* Establishing planning objectives involves analyzing the identified concerns regarding the use of water and related land resources in the study area to translate them into specific objectives for the study. These needs must be net of outputs which will be obtained without any change in existing resource management plans or programs; i.e., the "without condition." The data developed in prior activities of this task will be analyzed as a basis for translating needs, opportunities, concerns, and constraints into the planning objectives of the study. These objectives will be set forth and described as specifically as possible so as to provide a meaningful guide and focus for subsequent formulation activities.

(b) *Formulation of alternatives—Task 2.* Formulation of alternatives is the development of different resource management plans to address the planning objectives. The plans which are initially formulated will be assessed and evaluated. Plans which best address NED, EQ, and a mix of the two will be identified. Candidates for the NED plan are those which are likely to maximize net economic benefits and candidates for the EQ plan are those likely to make significant contributions to preserving, maintaining, restoring, or enhancing cultural and natural resources. During subsequent iterations, candidate plans will be reformulated to insure that the best NED, EQ, and mixed plans are included in the final array of alternatives. Designation and reformulation of candidate plans requires substantial professional analysis and judgment and should reflect public preferences and desires. The NED plan and the EQ plan are not intended to establish a polar condition, since plans which optimize NED and those which emphasize EQ must still meet a range of specific evaluation criteria, and therefore, could be similar or even the same plan. Where the NED plan and EQ plan are significantly different, other alternatives reflecting significant trade-offs between them will be formulated so as not to overlook the best overall plan. Non-structural measures will be considered in Stage 1 and Stage 2 and every reasonable effort should be expended to carry such a measure, where viable, through Stage 3. Where relevant to addressing public concerns, "no development" plans may also be formulated. Activities to be carried out in formulation of alternatives are as follows:

(1) *Identify measures.* A broad range of technical and institutional measures, structural and nonstructural, for potentially satisfying the planning objectives will be set forth. The identification and consideration of measures proposed or suggested by different interest groups is essential. The result is a preliminary identification and description of all the different management measures that might be applicable to a given study.

(2) *Consider plans of others.* Other plans proposed by governmental or nongovernmental interests, will be identified and included in the planning process. These will include appropriate "non-Federal" plans that would likely be undertaken in the absence of the Corps plan. Such plans or portions of them will be included, where appropriate, in the alternative plans being considered in the study.

(3) *Develop plans.* Plans will be developed by analyzing the complementary and competitive interactions among measures, to identify and minimize conflicts, to obtain consistency, and to insure completeness to the extent possible. Subsequent impact assessment and evaluation will narrow the range of alternatives and establish a basis for effective choice among plans.

(c) *Impact assessment—Task 3.* Assessment is the identification, description, and, if possible, measurement of the impacts of the alternative plans. Consistent with the requirements of the P&S, section 102(2)(c) of NEPA, and section 122 of the River and Harbor and Flood Control Act of 1970, impact assessment provides for analyzing the significant effects of each alternative. These are the economic, social, or environmental consequences of an alternative which would be likely to have a material bearing on the decisionmaking process. Impact assessment requires forecasting where and when significant effects could result from implementing a given alternative. This determination requires analyzing and displaying monetary and nonmonetary changes in an objective manner based on professional and technical assessment of the resources. The absence of change or no net change from the "without condition" could also be significant in certain instances and care must be taken to surface such information during this task. Describing impacts does not reflect social preferences; these preferences are determined through subsequent evaluation. Activities to be carried out in impact assessment are as follows:

(1) *Determine sources of impacts.* The aspects of each alternative that could cause significant impacts will be identified and specified. This requires analyzing the inputs, measures, and outputs associated with the alternatives to determine causative factors that could change elements of the "without condition."

(2) *Identify and trace impacts.* The causative factors related to each alternative plan should be compared to the

elements of the "without condition" for the purpose of identifying impacts. This requires forecasting whether these factors could cause significant changes. Accomplishing this requires cause and effect analysis to identify and trace through those impacts which are significant.

(3) *Measure impacts.* As precisely as possible, the magnitude of each impact should be determined. This is determined by objective comparison of the "with condition" and "without condition." The impacts should be quantified using appropriate monetary or nonmonetary units or concisely characterized in a written description.

(4) *Specify incidence of impacts.* The geographical location of each impact should be identified. In addition, it will be necessary to establish when impacts are expected and their duration.

(d) *Evaluation—Task 4.* Evaluation is the analysis of each plan's impacts. Whereas impacts are identified through an objective undertaking largely on professional analysis, evaluation determines the subjective value of these changes. This is accomplished by conducting "with and without" analysis of the alternative plans based on the changes identified in impact assessment and ascribing values to the impacts based on public input and the planner's judgment. The process begins by establishing the contributions of each alternative in relation to the planning objectives and the NED, EQ, RD, and SWB accounts of the P&S. Then the response of the alternative plans to specified evaluation criteria will be determined. From this information, judgments will be made concerning the beneficial and adverse nature of the contributions of an alternative to establish its overall desirability. After this has been done for each alternative, plans that do not result in an improvement over the "without condition" will be eliminated from further consideration. The first three activities listed below provide more explicit information on performing these aspects of evaluation. The relative merits of each remaining alternative in comparison with the other remaining alternatives will then be established. By so doing, evaluation will surface information which will be incorporated in succeeding iterations so as to more fully achieve beneficial contributions while reducing adverse contributions. Activities to be carried out in evaluation are as follows:

(1) *Appraise planning objective fulfillment.* The degree to which the alternative plans contribute to the planning objectives will be determined. This involves relating the significant impacts of each alternative to the planning objectives and determining if and how well the different alternatives contribute to the objectives.

(2) *Appraise system of accounts contributions.* Each plan is valued in terms of its beneficial and adverse consequences on the four accounts. This involves analysis of each significant impact to determine the positive or negative contributions a plan will make in regard to NED, EQ, RD, and SWB. A fuller explanation regarding the content and use of the System of Accounts is contained in part 393 of this chapter.

(3) *Apply specified evaluation criteria.* Criteria which will be applied to provide a basis for evaluating alternative plans are acceptability, completeness, effectiveness, and efficiency, which are explicitly stated in the P&S, and certainty, geographical scope, NED benefit-cost ratio, reversibility, and stability which are derived from the first four. These criteria and their application are discussed more fully in part 295 of this chapter. Determining certainty, stability, and reversibility requires the use of sensitivity analysis, alternative futures, and risk and uncertainty analysis as specified in the P&S.

(4) *Perform trade-off analysis.* Trade-off analysis is the actual comparision of plans, based upon perceptions of affected groups and the results of applying all the appropriate evaluation criteria. Its purpose is to identify plans which serve a wide range of interests, including the Federal Interest. Alternative plans must be compared in such a manner that impacts measured in dissimilar units may be traded-off in such a way that the public and decisionmakers are provided a basis for effective choice.

(5) *Designate the NED plan and EQ plan.* Based on the criteria specified in the P&S and § 295.10 of this chapter, designate the alternative plans which are the NED plan and the EQ plan or the plan that is least damaging to the environment.

(e) *Determine if repeating the planning tasks is necessary.* At the completion of evaluation, the results of carrying out the four planning tasks will be analyzed to establish the necessity for, or direction of, the next iteration. If reiteration is necessary, the planning tasks will be repeated to develop more precise and detailed plans that more fully address the planning objectives while minimizing adverse economic, social, and environmental impacts. To aid in this, specific criteria listed in part 295 of this chapter, will be applied for reformulating candidate NED plans, candidate EQ plans, and for those plans which provide a mix of NED and EQ contributions. When a satisfactory set of detailed, implementable plans result from an iteration in Stage 3, the plan selection and recommendation criteria described in § 290.11 of this chapter will be applied.

§ 290.10. Plan development stages.

Developing plans in three stages provides for improving and increasing the level of detail and reliability of data and analyses, and for incrementally developing more precise alternative plans throughout a study. The three stages are described below and are discussed more fully in § 291 of this chapter.

(a) *Stage 1—Reconnaissance.* During the initial stage, the four planning tasks are performed at a preliminary level of detail to define the scope and character of the study to determine whether additional study is warranted and as a guide to subsequent planning. During this stage, principal emphasis will be on identification of the range of issues related to resource management in the study area. Because of the introductory nature of the planning tasks at this stage, the effort will generally involve analyzing a wide range of available data, which may be more qualitative than quantitative. The general purpose of this stage is to make an initial analysis of water and related land resources management problems and how they could be solved. The product will be a Reconnaissance Report.

(b) *Stage 2—Development of intermediate plans.* The intermediate stage emphasizes identifying and analyzing the range of alternative ways for addressing the planning objectives. Considerable emphasis must be placed on more specifically defining these objectives. Based on a more definitive analysis of the objectives, alternatives will be outlined and refined without concentrating on detailed engineering or design considerations. Data should be sufficient to set forth and analyze alternative concepts of resource management. The expected impacts of these alternative plans are to be assessed and evaluated, concentrating on their significant consequences. A high level of detail is not appropriate at this stage. The alternatives developed should provide choices as to the different viable resource management options for more detailed studies in Stage 3.

(c) *Stage 3—Development of detailed plans.* During the final stage, emphasis is on modifying, assessing, and evaluating the intermediate alternatives carried into Stage 3 from Stage 2 to produce detailed, implementable plans. Design, assessment, and evaluation in this stage require data that is specific and well defined. The alternative plans produced at its completion must be at a comparable level of detail so that an effective choice can be made.

§ 290.11. Plan selection and recommendation.

Stage 3 of the planning process provides the basis for selecting one of the

detailed plans and, if appropriate, recommending it for authorization. Generally, only one plan should be selected regardless of whether or not it is within the existing general authority of the Corps. If the selected plan falls under the Corps authority, then it can be recommended by the District Engineer for implementation. If the selected plan is not within existing Corps authority, the reporting document should describe how it could be implemented.

(a) *General.* Plan selection is the designation of that alternative plan considered to be the most desirable, based on the results of the study. Plan recommendation is the act of proposing Corps participation in implementing the selected plan. Plan selection and recommendation occur after the last iteration of the planning process, at which point a range of detailed plans, any of which could be selected, will be displayed in the System of Accounts § 393 of this chapter.

(b) *Plan selection.* The District Engineer will select the plan in the best public interest. This selection will be based upon the public reponse to the detailed plans carried through the final stage. This response will include the views of those who participated in the study and will be obtained by formal and/or informal means. The product of evaluation will be clearly presented as a basis for public inputs to plan selection.

(c) *Plan recommendation.* There are two basic criteria for plan recommendation: The net benefits rule and Corps authority to implement. When both criteria are met, the District Engineer will follow established procedures for recommending Federal (Corps) participation in implementation.

(1) *Net benefits rule.* A recommended plan when considered individually on the basis of "with" vs. "without" comparison must be justified in the sense that total benefical contributions (monetary and non-monetary) exceed total adverse contibutions (monetary and non-monetary). Further, the recommended plan must have net NED benefits unless the deficiency is the result of NED benefits foregone or costs incurred to obtain positive EQ (non-monetary) contributions. This means that a recommended plan which has no net economic benefits must make positive contributions to the environment when evaluated against the without condition. Exceptions to the net benefit rule will be extremely rare and will be based upon prior approval by the Secretary of the Army; coordination will be through DAEN-CWP. Exceptions might include unique and overriding social considerations, such as extreme loss of life.

(2) *Corps authority.* The Corps Civil Works authority has been established by various Acts of Congress since 1824. In the event a selected plan is not within Corps implementation authority, the following provisions apply.

(i) If the selected plan or a portion thereof is not within existing Corps implementation authority, but is responsive to the planning objectives established for the study, the reporting officer may recommend Federal (Corps) participation. The basis for and extent of such participation will be specified, including the precedent-setting aspects of the recommendation. Such recommendations shall be fully coordinated through DAEN-CWP before commitments are made to States or local interests.

(ii) If the selected plan falls entirely within the authority of another Federal agency, no recommendation for Federal (non-Corps) implementation will be made. The other agency will be informed of the Corps' finding by the Chief of Engineers.

§ 290.12 Effective date and applicability to planning programs.

This regulation is effective January 1, 1979.

(a) Applicability of this regulation to Water Resources Council Level A and B studies is determined on a case-by-case basis, in accordance with guidance provided by the Water Resources Council and dependent on the Corps role in the study (see § 252 of this chapter).

(b) This regulation is fully applicable to all Level C preauthorization studies conducted after the effective date, including those initiated prior to the effective date.

(c) Applicability of this regulation to Phase I GDM studies is dependent on the date the project was authorized by Congress and the extent of changes recommended to the authorized project. The emphasis of the tasks and stages during a Phase I study will be different depending upon whether the survey scope study was conducted employing this regulation.

(d) This regulation is applicable to continuing authority studies, as discussed in Appendix C, Part 263 of this chapter.

(e) This regulation is generally applicable to other special or comprehensive planning studies funded under the Corps General Investigations appropriations title. Exceptions may be granted on a case-by-case basis by the Chief of Engineers.

PART 291—PLAN DEVELOPMENT STAGES (ER 1105-2-210)

Sec.

291.1 Purpose.
291.2 Applicability.
291.3 References.
291.4 General.
291.5 Stage 1—Reconnaissance.
291.6 Stage 2—Development of Intermediate Plans.
291.7 Stage 3—Development of Detailed Plans.
291.8 Effective Date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

§ 291.1 Purpose.

This regulation describes the nature and scope of the three plan development stages to be used in multiobjective planning, consistent with the WRC Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPS), and related policies.

§ 291.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 291.3 Reference.

(a) ER 11-2-220
(b) ER 1105-2-10

This regulation supersedes ER 1105-2-210, November 10, 1975.

(c) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290)
(d) ER 1105-2-220, Problem Identification (33 CFR Part 292)
(e) ER 1105-2-250, Evaluation (33 CFR Part 295)

§ 291.4 General.

The planning process has been divided into three stages to facilitate the management of the study. Specific objectives and supporting documentation requirements are defined for each stage. The staged planning process provides a mechanism by which the assumptions, data and conclusions of the study will be reviewed by both Corps echelons and the public as the study progresses. The stages of planning have been incorporated into the budgetary process and the Intensive Management Program (see ER 1105-2-10).

§ 291.5 Stage 1—Reconnaissance.

The purpose of the first stage of the planning process is to conduct reconnaissance level investigations to determine whether a survey scope feasibility study is warranted and, if warranted, to develop a detailed scheme for Stage 2 planning. Reconnaissance investigations should address the four functional planning tasks primarily on the basis of available information, coordination and public involvement.

(a) *Planning tasks.* The general approach should be broad in order to identify the need for additional investigations and analyses in Stages 2 and 3. The emphasis should be on problem

identification. The other three planning tasks require less attention during Stage 1.

(1) All activities described in Part 292 of this chapter should be addressed at the reconnaissance level in Stage 1. Public concerns should be actively sought to facilitate a comprehensive approach to the planning effort. This approach will encourage consideration of a broad array of environmental and social values and concerns. Moreover, it will help assure that resources of particular value or critical concern are highlighted for more detailed study in subsequent planning. Based on these and other problem identification activities, an initial definition of the planning objectives should be made. The planning objectives should be as specific as possible at the end of Stage 1, even though they may be refined in Stages 2 and 3.

(2) Formulation should concentrate on identifying potential management measures.

(3) Impact assessment should concentrate on identifying potentially significant impacts.

(4) Evaluation should concentrate on those analyses which will provide the basis for determining whether a continuation of the study is warranted.

(b) *Public involvement.* Public involvement should be addressed in a minimum of three ways in Stage 1. First, lines of communication should be opened with interested and affected agencies and non-governmental groups. Second, the Corps should circulate a draft Reconnaissance Report or other appropriate Stage 1 planning document for public review and conduct a public meeting. And third, a public involvement program for Stage 2 should be developed in detail, with follow-on activities identified for stage 3.

(c) *Reconnaissance report.* A Reconnaissance Report will be prepared and transmitted to the division engineer for approval at the conclusion of Stage 1. The report will document the need for further study, the results of the investigations accomplished during Stage 1, and, if the recommendation is to continue the study, the detailed management information necessary for accomplishing Stage 2 planning. (See also definition of Reconnaissance Report in Part 290 of this chapter.)

(1) If continuation of the study is recommended, management information should include an updated Study Cost Estimate (PB-6) and a detailed description of Stage 2 work activities. Work activities should be structured into the accounts and subaccounts prescribed by ER 11-9-220 and should be appropriately defined for incorporation into the Resource Analysis/Project Management (RA/PM) system.

(2) If continuation of the study is not recommended, the district engineer should indicate whether the study should be temporarily suspended or whether it should be terminated by the submittal of a report to Congress.

§ 291.6 Stage 2—Development of intermediate plans.

In this stage, a broad range of alternative plans and management measures are explored. Stage 2 results in a screening of alternatives by carrying out sufficient iterations of the four planning tasks to decide which plans, if any, warrant more detailed study in Stage 3. The Stage 2 screening will reduce the number of alternatives to those which are most feasible under the evaluation criteria provided in Part 295 of this chapter.

(a) The emphasis in this stage is to formulate alternatives that reflect an array of realistic ways of managing the resources of the study area. To accomplish this, detailed problem identification must be conducted to precisely specify the planning objectives. Additional data should be gathered to satisfy any deficiencies in the data base. Technical and institutional measures for addressing the objectives should be more precisely set forth. This should not unduly constrain the breadth of the measures considered. Overdependence on design detail is not appropriate. Developing alternative plans which incorporate nonstructual measures should receive considerable attention during this stage.

(b) Impact assessment should be sufficient to identify major changes from the "without condition." This is accomplished by developing a detailed "without condition" and comparing it to each alternative plan. The level of detail will increase as this stage proceeds. Iterations of the assessment and evaluation tasks will provide the information necessary to allow for the screening out of less responsive alternatives, and the identification of those which appear to be most feasible.

(c) The level of detail should be sufficient for the public and higher authority to review and understand the rationale used in developing and screening the alternatives. (See also the definition of "Intermediate Plan" in Part 290 of this chapter.)

(d) If the ongoing study establishes that there are valid, compelling reasons to plan toward positive Regional Development (RD) and/or Social Well-Being (SWB) contributions, approval should be sought from the Secretary of the Army, through DAEN-CWP, prior to the conclusion of Stage 2. The Secretary of the Army must approve any exceptions prior to the initiation of Stage 3.

(e) As a general rule, the alternative plans selected for detailed study in Stage 3 should possess the following characteristics:

(1) Each plan should represent at least one of the following: a way to optimize NED outputs; a way to emphasize EQ; a mix of NED and EQ; an alternative desired by some segment of the public; or an alternative responsive to an OCE policy or plan formulation requirement.

(2) Each plan must be "justified," based on Stage 2 planning, in the sense that its total beneficial contributions (monetary and nonmonetary) are equal to or exceed its total adverse contributions (monetary and nonmonetary).

(3) Each plan will represent uses of the water and related land resources of the study area for either Corps mission-related purposes, or other non-Corps purposes which represent viable alternatives, although each plan need not provide contributions to all planning objectives established for the study.

(4) Plans should reflect distinct differences. These may include differences in technology, institutional arrangements, levels of output, impacts, or public perceptions. These differences should be highlighted so that the Stage 2 documentation will clearly show why each plan is being proposed for more detailed study in Stage 3.

(f) Stage 2 documentation will be prepared to support the above characteristics and will be utilized as part of public involvement and the Intensive Management Program. This documentation should include a detailed description of work activities for Stage 3 planning, or if a determination is made that further studies are not warranted, the Stage 2 documentation shall be made available to State and local planning agencies after termination of the Study has been approved by the division engineer. If a study is terminated during Stage 2, a brief report should be prepared for transmittal to Congress to explain the reasons for termination and actions taken by the Corps to provide State and local interests information which may be useful to them.

§ 291.7 Stage 3—Development of detailed plans.

Stage 3 emphasizes the detailed assessment and evaluation of a small number of alternatives. It involves carrying out the four planning tasks to a level of refinement which assures that each of the plans considered in Stage 3 is formulated in the best possible way to achieve the desired planning objectives, to assure that each of the plans is implementable, and to support the selection of the best plan. If the criteria in § 290.11, of this chapter are met, Stage 3 also includes further development of the selected plan to support a recommendation for Congressional authorization for Corps of Engineers implementation. The primary documen-

tation in Stage 3 will be the draft and final study report.

(a) In addition to the characteristics described in paragraph 6e, Stage 3 plans should also reflect the following:

(1) Each plan should represent a complete technical system together with the necessary implementation arrangements.

(2) Each alternative in Stage 3 should be developed to a comparable level of detail with respect to engineering, environmental, economic and social data to the extent necessary to conduct trade-off analysis and to select the best plan for implementation.

(b) After a plan has been selected on the basis of the Stage 3 evaluation and trade-off analysis, a draft Environmental Impact Statement (EIS) should be completed if Federal implementation action will be proposed. Sufficient environmental data and analyses should be available from the study, conducted under the 1105-2-200 series of regulations, to complete the draft EIS. Additional study effort may be necessary to support the preparation and presentation of recommendations to Congress after the public has commented on the draft EIS and draft Stage 3 report.

(c) Public involvement is an important imput to the evaluation and trade-off analysis throughout Stage 3 planning. The evaluation should be presented at the Stage 3 public meeting. The draft report which includes the draft EIS should be distributed for public review prior to the Stage 3 public meeting.

§ 291.8 Effective date.

This regulation is effective January 1, 1979. The provisions of § 290.12, of this chapter are applicable to this regulation.

PART 292—PROBLEM IDENTIFICATION (ER 1105-2-220)

Sec.
292.1 Purpose.
292.2 Applicability.
292.3 References.
292.4 General.
292.5 Identify public concern.
292.6 Analyze resource management problems.
292.7 Define the study area.
292.8 Describe the base condition.
292.9 Project future conditions.
292.10 Establish planning objectives.
292.11 Effective date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

§ 292.1 Purpose.

This regulation provides guidance for carrying out the problem identification task of multiobjective planning, consistent with the WRC Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPA), and related policies.

§ 292.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 292.3 References.

(a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290).

(b) ER 1105-2-921, Feasibility Reports: System of Accounts (33 CFR Part 393).

(c) EM 1120-2-118.

§ 292.4 General.

This task is undertaken to define the physical area and the nature of water and related land resource management problems that the study will address. As outlined in Figure 1, the task of problem identification culminates in delineation of the planning objectives which guide the formulation of alternative plans. The following paragraphs discuss the activities included in problem identification.

§ 292.5 Identify public concerns.

Initially, problem identification involves eliciting information from the public about the range of needs (opportunities and problems) which the study could address. Properly accomplished, this directs subsequent activities to respond to public, in addition to agency, perceptions.

(a) The types of problems, concerns, and opportunities to be addressed are limited to issues related to water and related land resources management. Issues relasting to regional population growth, economic development, and transportation policies; attitudes about ownership and use of land, community aesthetics, and significant environmental phenomena; and other similar concerns are also to be considered where relevant to the management of water and related resources.

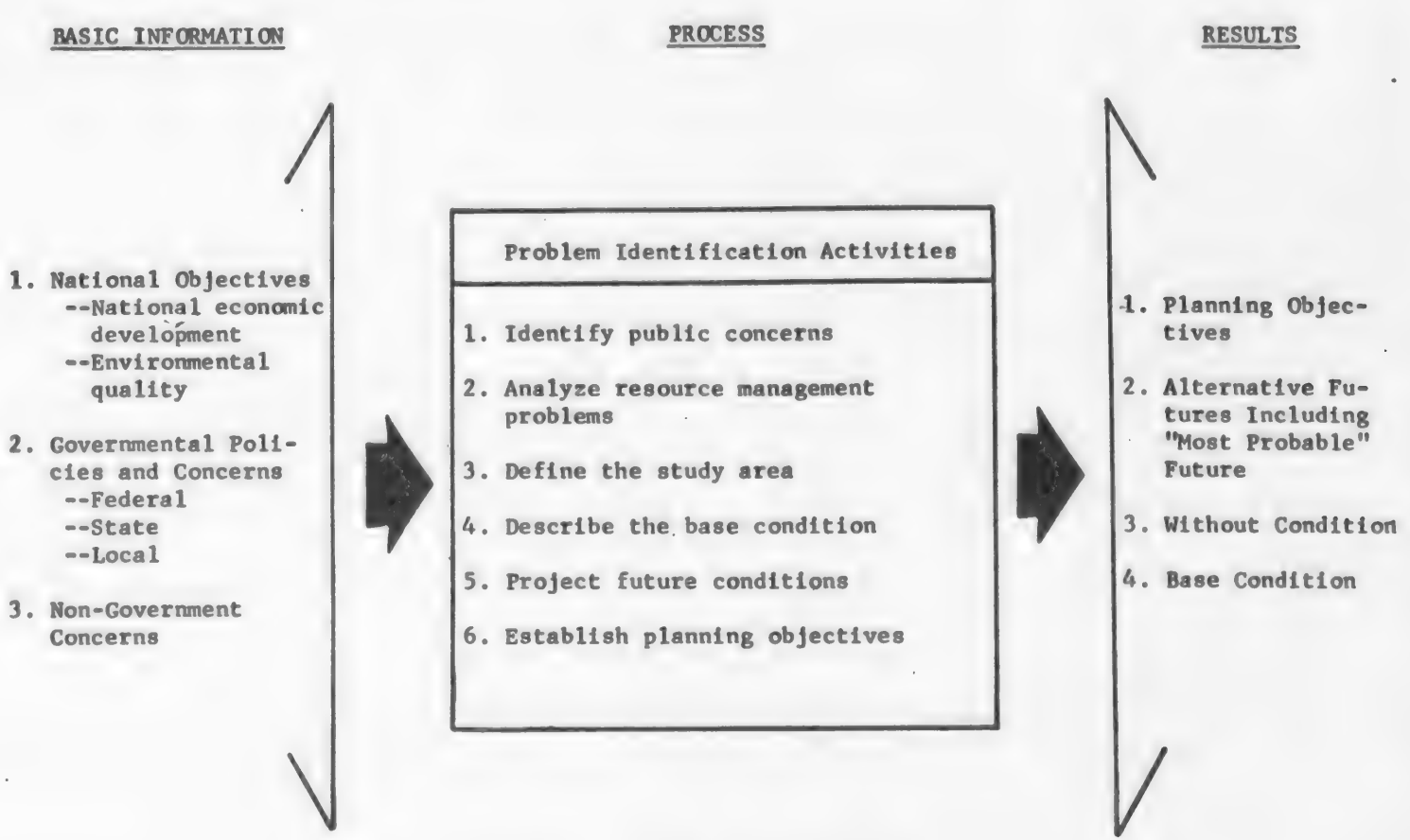

Figure 1: Problem Identification

Governmental Sources

A. Federal Government

I. Legislation
- a. Specifically Related to Water Resources
  - R&H Acts
  - PL 92-500
  - Wild & Scenic Rivers Bill
- b. Not Specifically Related to Water Resources
  - NEPA
  - Transportation Acts
  - Wilderness Bill

II. National Policies and Related Actions
- a. Specifically Related to Water Resources
  - P&S
  - Exec. Order 11296
- b. Not Specifically Related to Water Resources
  - National Goals
  - Energy Conservation Requirements

III. Agency Policy and Related Actions
- a. Within the Corps
  - ER's, EC's, & Multiple Letters
  - Environmental Inventories
  - Previous Study Reports
  - IWR Reports
- b. Outside the Corps
  - WRC Studies and Requirements
  - Other Agency Requirements and Studies

B. Non-Federal Government

I. State
- a. Governor's Office
- b. Legislature
  - Existing Legislation
  - Pending Legislation
- c. Policies & Administrative Agencies
  - Planning
  - Fish & Wildlife
  - Health
  - Water Supply
  - Water Quality
  - Recreation
  - Land Use
  - Transportation
  - Agriculture
  - Commerce
  - Natural Resources

II. Local
- a. Counties
- b. Cities
  - Land Use Plans
  - Transportation Plans
  - Recreation Plans
  - Public Service Plans
  - Education

III. Regional
- a. Councils of Government
- b. Interstate Agencies
- c. Basin Commissions

Non-Government Sources

I. Scientific/Professional/Business Organizations
- a. Universities
- b. Clubs
- c. Fraternal Orders
- d. Chambers of Commerce

II. Private Industry

III. News Media

IV. Citizens Groups
- a. Environmental
- b. Civic
- c. PTA's
- d. Consumer Groups
- e. Political Clubs
- f. Social Action
- g. Religions
- h. Home Owners Associations

Figure 2. Representative Information Sources

(b) Concerns should be elicited through a public involvement program in which public officials, interest groups, governmental bodies and other segments of the public participate in a meaningful way. Figure 2 displays a representative list of information sources which should be consulted to identify concerns. Planner's knowledge unique to local and regional situations will result in the identification of additional resources. Meetings, news media presentations, brochures, citizen assistance committee, and the like are all useful tools that should be employed in obtaining this information. Public involvement, while necessary, is not sufficient to a successful outcome from the planning process. The planner is responsible for exercising the necessary professional judgment and analysis to insure that all issues, concerns, needs, opportunities, desires, and constraints related to the study effort are identified.

§ 292.6 Analyze resource management problems.

Many of the publics' concerns will be directly related to problems or issues that can be achieved through water and related land resources management. Careful professional analysis will be necessary to determine whether a link exists. Considerable attention must be given to examining the relationship of the traditional water resources "needs" categories to the overall study effort. It is mandatory to update or confirm the authenticity of the needs in light of differing public perceptions and interim actions that may have been undertaken. Preestablished levels of resource development output should not be specified for study. Public feedback should be obtained when a tentative listing of problems have been identified to ascertain their relevance and completeness. Refinement and clarification of problems should be accomplished through extensive professional analysis and by interaction with the public. This activity is critical to the planning process because it establishes the range of problems to be addressed and their validity from both public and professional viewpoints.

§ 292.7 Define the study area.

Determination and specification of the study area aids in establishing the scope and character of planning. To specify the area of the study, the previously identified resource management problems will be analyzed to identify their geographic distribution. This requires tracing out the problems and concerns to their ultimate physical location. Careful attention must be given to this activity to insure that the study area is appropriately defined based on the identified range of problems. In most instances, the concerns and problems will correspond geographically to the area specified in the study authority. However, in some cases, the study area that is defined may be different than that contained in the study authority.

(a) For instance, the publicly expressed needs might not be capable of being addressed by resource management activities that could be undertaken in the study area. In addition, it might be determined that resource management activities in the study area could have a significant effect on areas outside that specified in the study authority and that they should also be included in the study. If analysis shows that the study area should be different than the area specified in the study authority, the desirability of seeking a new authority should be referred to HQDA (DAEN-CWP) WASH DC 20314.

(b) Another possibility that could occur is when a study will address only a small portion of the area designated in the authority or will consider a limited range of resource management problems. In the former case, it is the responsibility of the reporting officer to insure that the solution for the smaller area is consistent with broader concerns and that no solution has been overlooked due to the limited geographic scope of the study. In the latter case, single purpose solutions should not overlook synergistic possibilities nor possible conflicts that could arise.

§ 292.8 Describe the base condition.

The base condition is a composite of existing (at the time of the study) economic, social, and environmental characteristics of the area under study. Describing the base condition of the study area should begin with an analysis of available local, regional, and state-wide planning data. These planning data may be in a variety of forms, including land use plans, urbanization or industrialization data or projections, and completed transportation or public utility studies. Active involvement by non-Corps elements should be sought to assist in identification of the base condition of the study area. The base data gathered initially will be rather general. As the study progresses and alternatives are better detailed and locations more defined, more specific information on all aspects of the base condition will be required. The base condition should be described in terms of the existing land, air, and water use, as well as economic, social, and environmental characteristics of the study area perceived to be important. The base condition of the study area related to water and related land resource management should include the following information identified and described according to geographical location, quantity, and quality as appropriate.

(a) A description of the resource base includes a brief and relevant summary of the climate, geology, and typography; human and natural resources, both physical and biological; demographic, cultural, and aesthetic characteristics; and use, particularly emphasizing uses within the flood plain as contrasted to uses outside the flood plain; transportation network; financial resources; and economic activity including manufacturing, trade, and agriculture.

(b) The description of significant environmental elements in the study area will locate and identify those characteristics deemed to be aesthetically, ecologically or culturally important. To identify significant environmental elements, factors should be analyzed such as soils, water, air, cities, plants and animals (including people and their culture); forces such as wind, tides, gravity and human activities; conditions such as light, temperature, pollution, and humidity; and processes such as photosynthesis, mineral cycling, and decomposition. This involves inputs from the scientific/professional community as well as the public at large. The description must reflect that environmental elements are important to society in a present as well as future context. As part of this description, elements should be explicitly identified which are critical in terms of their scarcity, fragility, or lack of resiliency, or which would otherwise be sensitive to change.

(c) The description of existing public and private programs for planning and managing resources in the study area will include a delineation of management systems and facilities in operation as well as those under construction, funded for construction, or approved for construction.

(d) The institutions dealing both directly and indirectly with resource management in the study area will also be identified. This should provide necessary information on existing jurisdictional, functional, and financial arrangements in the study region.

(e) Careful analysis must be made of information collected about the base condition to establish its adequacy for use throughout the study. If adequate information is not available for the purpose of the study, early efforts must be undertaken to correct the deficiencies. A sound, reasoned determination of needed data must be made early in the process to assure timely acquisition at reasonable cost.

§ 292.9 Project future conditions.

There are major uncertainties associated with projections of future conditions. The Principles and Standards (P&S) require that alternative plans be examined to determine their sensitivity to data availability and to alternative assumptions as to future eco-

nomic, demographic, environmental, and technological trends. In addition, the P&S requires that selected projections and assumptions of alternative futures that are reasonably probable and that, if realized, would appreciably affect plan design or scheduling be analyzed. To accommodate this requirement, it is necessary to examine expressed opinions and assumptions about the future of the study area and to designate what is considered to be the "most probable future". Derivation of planning objectives will reflect this "most probable future", and more specifically, the "without condition". Sensitivity analysis will be conducted during the evaluation task to establish the relationship of the alternative plans to all the different significant assumptions about the future conditions of the study area.

(a) The views of various segments of the public concerning their desires for the future of the study area as well as the views of the professional planner should form the basis for projecting future conditions. The process of seeking public expressions concerning the future and developing composites that reflect their views should continue until a workable projection for establishing planning objectives can be developed.

(b) Specification of future conditions should reflect projections currently used by Federal, state, and local planning agencies. OBERS Series E Prime projections will be used as a basis for most studies. In certain instances, because of conditions unique to the study area or the limited size of the study area, OBERS may not be totally satisfactory. Deviation from OBERS is acceptable if adequately justified and explained. When the study area is very small in size, other projections will be needed to provide sufficiently detailed projections of those conditions which affect the definitions of planning objectives over time. Such projections may be prepared by a State or other non-Federal entity, other Federal entity, or independently by the Corps. The projections used must be adequate under the criteria of EM 1120-2-118.

(c) The planner must exercise considerable judgment and guard against simply projecting current trends. Careful empirical work can define reasonable relationships between demands for the outputs of water resource plans and key economic parameters such as population, income, and production. Where appropriate, demand should be related to those variables contained in the OBERS projections. This analysis permits the planner to focus on the relationship between price and quantity demanded.

(d) One necessary component of projecting alternative futures is to describe what would most likely happen without changing existing programs for resource management. This most probable future without a project should be based on sound professional analysis reflective of public expressions and historical trends. The most probable future is the projection of basic demographic, economic, environmental and social parameters. It provides the framework within which to define the "without condition", which is the detailed specification of the conditions which will prevail in the absence of implementation of a plan to alter the management of water and related land resources.

§ 292.10 Establish planning objectives.

Planning objectives are the national, state, and local water and related land resource management needs (opportunities and problems) specific to a given study area that can be addressed to enhance NED or EQ. However, planning objectives are not to be characterized as being specific to either national objective or related to any of the four P&S accounts (NED, EQ, RD, and SWB). Planning objectives should be stated in terms of resource management needs (problems and opportunities) and not as specific levels of resource management outputs that could be provided to satisfy the needs. Subsequent formulation will be carried out to establish if and how well the outputs of the plans address the objectives. Therefore, "increase open space in X county", "reduce urban flood damages along Y creek", and "maintain white-water boating on Z river" are appropriate statements of planning objectives. However, "provide 200 acres of open space in X county", "provide SPF protection on Y creek", and "provide 3,000 visitors days of white-water boating on Z river" are not appropriate planning objective statements because they predetermine the levels of outputs to be produced. Output levels are variable due to the nature and sizing of management measures and, as such, are a product of formulation and not a factor to be considered when establishing planning objectives.

(a) The components of the NED objective include:

(1) The value of increased outputs of goods and services resulting from a plan.

(2) The value of output resulting from external economies associated with a plan.

(b) The components of the EQ objective include:

(1) Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment.

(2) Management, preservation, or enhancement of especially valuable or outstanding archeological, historical, biological, and geological resources and ecological systems.

(3) Enhancement of quality aspects of water, land, and air by control of pollution or prevention of erosion and restoration of eroded areas.

(4) Avoiding irreversible commitment of resources to future uses.

(5) Others not listed in the (b) (1)-(4) of this section.

(c) Initially, establishing planning objectives involves analyzing the range of public and professional concerns expressed about the use of water and related land resources in the study area to translate them into specific objectives for the study. In addition, establishing the planning objectives involves determining those water resource needs (opportunities and problems) which must be addressed in relation to the "most probable" alternative future.

(d) Establishing planning objectives may reflect that given concerns, not necessarily directly related to either National Economic Development (NED) or Environmental Quality (EQ), could be so important as to impose absolute constraints on the planning process. These constraints may be of a legal, public policy nature or social, economic, or environmental factors of such importance that to violate them would compromise the validity of the entire planning effort. Where such constraints exist, they should be incorporated in the planning objectives. However, in specific cases, an existing legal constraint may be consciously overlooked if the study firmly proposes to recommend a change to modify it. Unless prior approval is obtained from HQDA (DAEN-CWP) WASH DC 20314, planning cannot be undertaken to provide positive distributional effects. This means that transfers to a region or social class will not be planned for; however, such effects may be displayed in the System of Accounts. Part 393 of this Chapter.

(e) Early in the planning process, planning objectives are likely to be relatively large in number and general in nature. While the study authority may direct attention to specific concerns, the authority should not be interpreted as limiting consideration of any appropriate planning objective. In addition, planning objectives should not be eliminated from consideration early in the process merely because they do not relate directly to traditional outputs of water and related land resources management.

(f) Identification of independent planning objectives assists in determining those objectives that should be carried through the process and those that may be dropped. A planning objective is independent if all measures for addressing it are unrelated to the measures addressing any other planning objective; i.e., the solution to one planning objective is not related to the

solutions to any other planning objective. This is significant because an independent objective, not within Corps authority to implement, may be appropriately excluded from further consideration. Such a decision would be made based on the findings of the evaluation task.

(g) As planning progresses, the planning objectives must be continuously reanalyzed in order that a manageable and well defined set is specified prior to developing the detailed plans. The final array of planning objectives must be defined narrowly enough to insure that all alternative means of meeting them have been examined in the study.

(h) The planning objectives should be specified to that level of detail sufficient to provide a precise description of each, including where and when it is to be achieved. Specific objectives may be in conflict, but the full range should be set forth as a basis for formulation. Subsequent planning tasks will establish whether the conflicting objectives can be fully or partially accommodated by a resource management program or, if not, what tradeoffs can be made.

§ 292.11 Effective date.

The regulation is effective January 1, 1979. The provisions of § 290.12 of this chapter are applicable to this regulation.

PART 293—FORMULATION OF ALTERNATIVES (ER 1105-2-230)

Sec.
293.1 Purpose.
293.2 Applicability.
293.3 References.
293.4 General.
293.5 Identify management measures.
293.6 Consider plans of others.
293.7 Develop plans.
293.8 Effective date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

§ 293.1 Purpose.

This regulation provides guidance on the formulation of alternative plans in multiobjective planning, consistent with the WRC Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPA), and related policies.

§ 293.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 293.3 References.

(a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290).

(b) ER 1105-2-250, Evaluation (33 CFR Part 295).

§ 293.4 General.

This task provides for developing alternative resource management systems that address planning objectives. To help insure that the best overall plan is developed, a range of alternative plans will be developed based on different sets of formulation and reformulation criteria. It is required that all the plans presented at the conclusion of the study will be fully implementable and could be selected. The types of plans which are either required or should be considered are described in § 293.7. Figure 1 outlines activities necessary in the formulation of alternatives.

§ 293.5 Identify management measures.

A wide variety of technical and institutional means exists for managing resources. As the basis for formulating alternative plans, a broad range of these means should be examined to identify those which can address one or more of the planning objectives. All appropriate measures should be identified without bias, including those proposed or suggested by different interest groups. Both structural and nonstructural means will be given equal consideration. In addition, the range of management measures should not be constrained by considering only those traditionally used by the Corps.

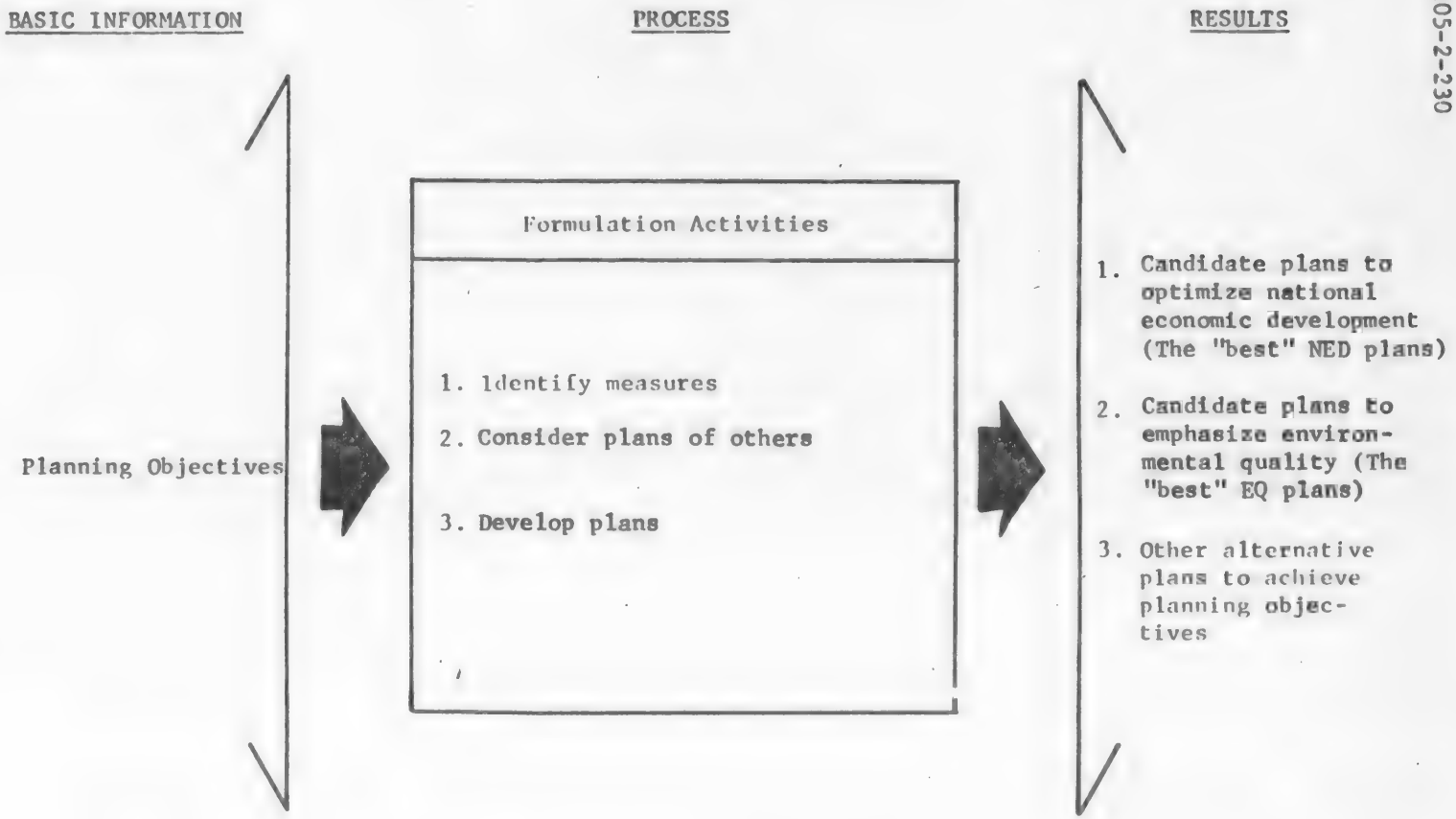
BASIC INFORMATION
PROCESS
RESULTS
Planning Objectives
Formulation Activities
1. Identify measures
2. Consider plans of others
3. Develop plans
1. Candidate plans to optimize national economic development (The "best" NED plans)
2. Candidate plans to emphasize environmental quality (The "best" EQ plans)
3. Other alternative plans to achieve planning objectives

Figure 1: Formulation of Alternatives

This activity should receive considerable attention during the initial iterations of the planning process. During the final iterations, this activity will be less critical because the range of measures applicable to the study will be reduced and more precise.

§ 293.6 Consider plans of others.

Federal, state, regional, and local governmental agencies may have plans, or parts thereof, for addressing the planning objectives of the study area. Public and private organizations may also have proposals or fully developed alternatives that should be considered during the planning process. Such plans or portions thereof should be included, where appropriate, in formulating the alternative plans. Judgement must be exercised to determine which of the proposals are viable and if they should be carried forward in the planning process.

§ 293.7 Develop plans.

This activity is crucial to each iteration since it is through combining different measures into resource management systems that alternatives are formulated to address the planning objectives. The "most probable future" employed to form the basis for establishing the planning objectives should be kept in mind during this process to aid in developing plans to complement it as well as serving as one basis for subsequently evaluating the alternative plans developed. During the initial iterations of planning, combining different measures will result in a preliminary range of alternatives for managing resources. During all subsequent iterations, most definitive systems made up by linking or combining a number of measures will be developed by applying the reformulation criteria discussed in this section.

(a) Combining the appropriate measures into alternative management systems should generally be sequenced as follows:

(1) Initially, measures that address more than one planning objective should be specified. This requires selecting a particular measure and determining the objectives it does and does not address. Care must be taken to identify conflicts between these measures and to enhance their compatibility to the extent possible. If irreconcilable conflicts between measures are apparent, the more desirable measure based on subsequent impact assessment and evaluation should be retained. After combining compatible measures that address a number of planning objectives, analysis should be conducted to establish those objectives that have not been fully or partially addressed and those for which additional measures should be considered.

(2) The second level of developing plans involves combining compatible measures which address only one planning objective. As a check, planning objectives which have not yet been fully or partially addressed will be identified.

(3) If appropriate, the third step involves reanalyzing the applicable measures to select and add ones that would be appropriate for more fully addressing the planning objectives.

(4) The purpose of this activity is to set forth a number of different resource management systems. The systems are to be composed of structural and nonstructural measures that, if implemented, would fully or partially satisfy the planning objectives.

(5) A major element in this development process is the necessity to modity, add, or delete measures in relation to addressing the planning objectives. The interactions among measures must be analyzed in relation to the criteria discussed in the evaluation task. As stated previously, the activity of developing plans must reflect the other activities involved in formulation of alternatives, as well as the imputs and outputs associated with problem identification, impact assessment, and evaluation. In addition, the formulation task must reflect the specific criteria established below for reformulating alternatives to develop the required NED Plan and the EQ Plan as well as other plans which address a mix of NED and EQ. This means that while developing plans can be expressed as a single activity, it must be integrated with the other activities that together comprise the planning tasks.

(b) All of the alternative plans developed should attempt to address a broad range of planning objectives without bias as to the economic or environmental nature of the output. Traditional project outputs such as flood control, fish and wildlife, water supply, and recreation should be included in all alternatives if related to addressing the planning objectives.

(c) As a practical guide, the range of alternative plans should reflect a broad spectrum of publicly held concerns. Therefore, formulation should involve developing a broad mix of plans reflecting the full range of planning objectives rather than focusing on justifying a single alternative for recommendation. These alternative plans are to be guided by the criteria outlined in (d), (e) and (f) of § 293.7 of this chapter which describe the NED Plan, the EQ Plan, and plans which address a mix of objectives. It should be recognized that all alternative plans are to be subjected to the evaluation criteria specified in § 295.8, Part 295 of this chapter, which may result in further modification of plans in the interest of meeting the criteria. For example, mitigation of the adverse effects of either an NED or EQ Plan to meet the evaluation criteria may be greater than that which would be provided if incremental NED or EQ benefits alone are required to exceed incremental costs.

(d) The Principles and Standards (P&S) require that to the extent possible during the planning process a plan which optimizes NED contributions and at least one plan which emphasizes EQ contributions will be formulated. Since the outputs of alternative plans may have varying economic consequences, it may be necessary to consider a number of alternatives as possible candidates for the detailed plan to be called the NED Plan. Because environmental consequences are not measured in a single standardized unit, it will be necessary to carry a number of plans emphasizing different environmental consequences through the planning process.

(1) An NED Plan addresses the planning objectives in the way which maximizes net economic benefits. Net economic benefits are maximized when plan scale is optimized and the plan is efficient. Scale is optimized when the benefits of the last increment of output for each measure in the plan equals the economic costs of that increment. A plan is efficient when the outputs of the plan are achieved in a least cost manner. An NED Plan will have net positive economic benefits. As is true for all alternatives, sound design based upon the interdisciplinary inputs of the planning team is required for an NED Plan. Because an NED Plan includes all measures to address planning objectives whose incremental dollar benefits exceed dollar costs, mitigation, preservation, or enhancement measures should be included when they are economically justified. Examples of this would be buying additional land to mitigate for wildlife habitat inundated by a reservoir or replacement of a highway when the dollar benefits from the purchase or replacement exceed its dollar costs.

(2) Recognizing that environmental quality has both natural and human manifestations, an EQ Plan addresses the planning objectives in the way which emphasizes aesthetic, ecological, and cultural contributions. Beneficial EQ contributions are made by preserving, maintaining, restoring or enhancing the significant cultural and natural environmental attributes of the study area. Determination of EQ benefits involves subjective analysis, underscoring the need for interdisciplinary planning with extensive public input to place values on the environmental contributions of plans. Designating an EQ Plan involves measuring the environmental changes related to different plans and selecting the plan which, based on public input, contributes to or is most harmonious with environmental objectives. This means

that candidate EQ Plans must make net positive contributions to the components of the EQ account. At a minimum, an alternative plan must make net positive contributions to the EQ account in order to be designated the EQ Plan.

(3) In some studies, it may be impossible to develop a plan that meets the minimum requirements for designating an EQ Plan; i.e., a plan that makes net positive contributions to the EQ account. In those cases, the plan which is least damaging to the environment will be identified.

(4) Because the general criteria used for the NED Plan and the EQ Plan are different, the measures contained in the plans will generally differ. There may be cases, however, when the two plans will be similar if not identical. This may occur when the measures contained in a NED Plan have little or no adverse environmental impact or, alternatively, they make important contributions to components of the EQ objective. Like a NED Plan, an EQ Plan may contain environmental preservation or enhancement measures which utilize the potential created by other measures to serve other component needs. Unlike a NED Plan, however, such measures may be justified in terms of environmental benefits not measureable in dollar terms compared to their costs. The acquisition of an area for habitat mitigation, cited under the NED Plan discussion, is also an appropriate example here. The justification for inclusion of such a measure in an EQ Plan may be based upon benefits not measurable in dollars. An EQ Plan is not a "do nothing" plan or a plan to maintain existing conditions. However, the management option of no action, letting the "without condition" occur, will be considered throughout the plan formulation process for purpose of comparison. Specific provisions are made for deriving a "no development" plan in § 293.7 of this chapter.

(e) Plans which serve significantly different mixes of NED and EQ should be formulated so as to not overlook the best plan. When considering alternative plans which reflect major trade-offs between NED and EQ, the addition of complementary measures to serve other planning objectives may considerably enhance the plan. An example is adding measures which contribute to EQ without reducing the economic effectiveness of the plan such as beautification of channel works through design modification and landscaping. These measures have often been found essential to make a structural solution to the problem acceptable to local interests. A basic question in formulating plans which address mixes of NED and EQ is the extent to which the planner should trade off economic benefits and incur additional economic costs to avoid adverse impacts on environmental quality or to provide environmental quality benefits. This is a difficult problem because environmental quality values are subjective and cannot be valued in explicit monetary terms. Yet when dollar costs or benefits are traded off for environmental considerations, an implicit evaluation is made that the net benefits are worth the dollar cost to obtain them. There will be uncertainty as to what the public consensus may be regarding trade-offs, and decisions cannot be reached until the range of trade-offs is shown to the public. Therefore, a variety of alternative plans should be initially developed which appear to represent the preferences of the various publics. During subsequent iterations, the alternatives can be refined and those which lack significant public support can be eliminated. The number of alternatives which address a mix of NED and EQ to be carried through to the end of the planning process is a function of both the diversity of public and professional expressions and the characteristics of the outputs possible for the measure available to address the planning objectives.

(f) The P&S also permit formulation of alternative plans "reflecting significant physical, technological, legal, or public policy constraints." This permits developing an alternative plan which provides a level of flood control protection greater than that which maximizes net benefits. Such an alternative would trade off NED for Social Well-Being (SWB); i.e., life, health, and safety benefits and thus can not be the NED Plan.

(g) Plans employing nonstructural measures should be formulated if they are economically and/or environmentally sound. While purely nonstructural alternatives may not provide workable solutions, alternatives which place heavy emphasis on nonstructural measures may be highly effective in meeting the planning objectives. As indicated elsewhere, nonstructural measures will be considered without bias throughtout the process and if a detailed plan is developed which primarily employs nonstructural measures it may be labeled a "nonstructural plan." Even if a "nonstructural plan" is not developed, the report of the District Engineer will fully describe how nonstructural measures were considered throughout the planning process and the role they played in the development and selection of the recommended plan.

(h) In formulating plans to increase beneficial contribution to the EQ account, consideration may be given to an alternative which explicitly precludes any significant forms of physical construction or development. Where such a "no development" alternative is considered, positive action normally will be required to assure that the "no development" concept can be realized. Environmental characteristics that the plan is designed to maintain or enhance through the "no development" alternative may change through time as a result of changing conditions within a planning setting. Positive actions, such as zoning or public land acquisition, may be necessary to accomplish the "no development" alternative.

§ 293.8 Effective date.

This regulation is effective January 1, 1979. The provisions of § 290.12 of this chapter are applicable to this regulation.

PART 294—IMPACT ASSESSMENT (ER 1105-2-240)

Sec.

294.1 Purpose.
294.2 Applicability.
294.3 References.
294.4 Relationship to guidelines for effect assessment pursuant to section 22, Pub. L. 91-611.
294.5 Relationship to preparation of an environmental impact statement (EIS).
294.6 General.
294.7 Determine sources of impacts.
294.8 Identify and trace impacts.
294.9 Measure impacts.
294.10 Specify incidence of impacts.
294.11 Effective date.

Appendix A—Sample Causative Factors.
Appendix B—Sample Project Effects.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778-24869, September 10, 1973.

§ 294.1 Purpose.

This regulation provides guidance on the assessment of impacts of alternative plans in multiobjective planning, consistent with the WRC Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPA), and related policies.

§ 294.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 294.3 References.

(a) Title I, Pub. L. 91-190, National Environmental Policy Act, January 1, 1970 (83 Stat. 852).

(b) Section 122, Pub. L. 91-611, River and Harbor and Flood Control Act of 1970, December 31, 1970 (84 Stat. 1818).

(c) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290).

(d) ER 1105-2-507, Environmental Impact Statements (33 CFR 209.410).

§ 294.4 Relationship of guidelines for effect assessment pursuant to section 122, Pub. L. 91-611.

Guidelines developed to meet the requirements of section 122, Pub. L. 91-611, as approved by the Secretary of the Army, were originally issued on September 28, 1972. These guidelines are superseded by the ER 1105-2-200 series of regulations.

§ 294.5 Relationship to preparation of an environmental impact statement (EIS).

This regulation provides general guidelines which are to be utilized in conjunction with ER 1105-2-507 in the conduct of environmental assessments and preparation of Environmental Impact Statements (EIS).

§ 294.6 General.

Impact assessment is primarily an objective analysis conducted to identify and measure the likely economic, social, and environmental impacts expected to result from implementation of alternative plans. These impacts form the basis for determining the beneficial and adverse contributions of the plans during the Evaluation task. Each of the alternative plans will be analyzed in relation to the "without condition" to determine expected changes. During impact assessment it is often times necessary to expand and more specifically define the parameters of the "without condition" as established in the Problem Identification task. For example, the "without condition" described in Task 1 may have water quality identified only as meeting state standards; but, for comparison, information is needed during impact assessment on specifics of the standards such as turbidity, BOD and water temperature. In any event, a consistent description of the "without condition" must be established. Based on the foregoing information, the "with condition" and "without condition" will be compared. The difference in each pertinent parameter between the "with condition" and the "without condition" is the impact of the plan. The assessment will be commensurate with the level of detail of the alternatives. Assessment reflects increasing precision as it is conducted during the later iterations of the planning tasks in Stage 2 and throughout Stage 3. The following paragraphs discuss the activities included in impact assessment, as depicted in Figure 1.

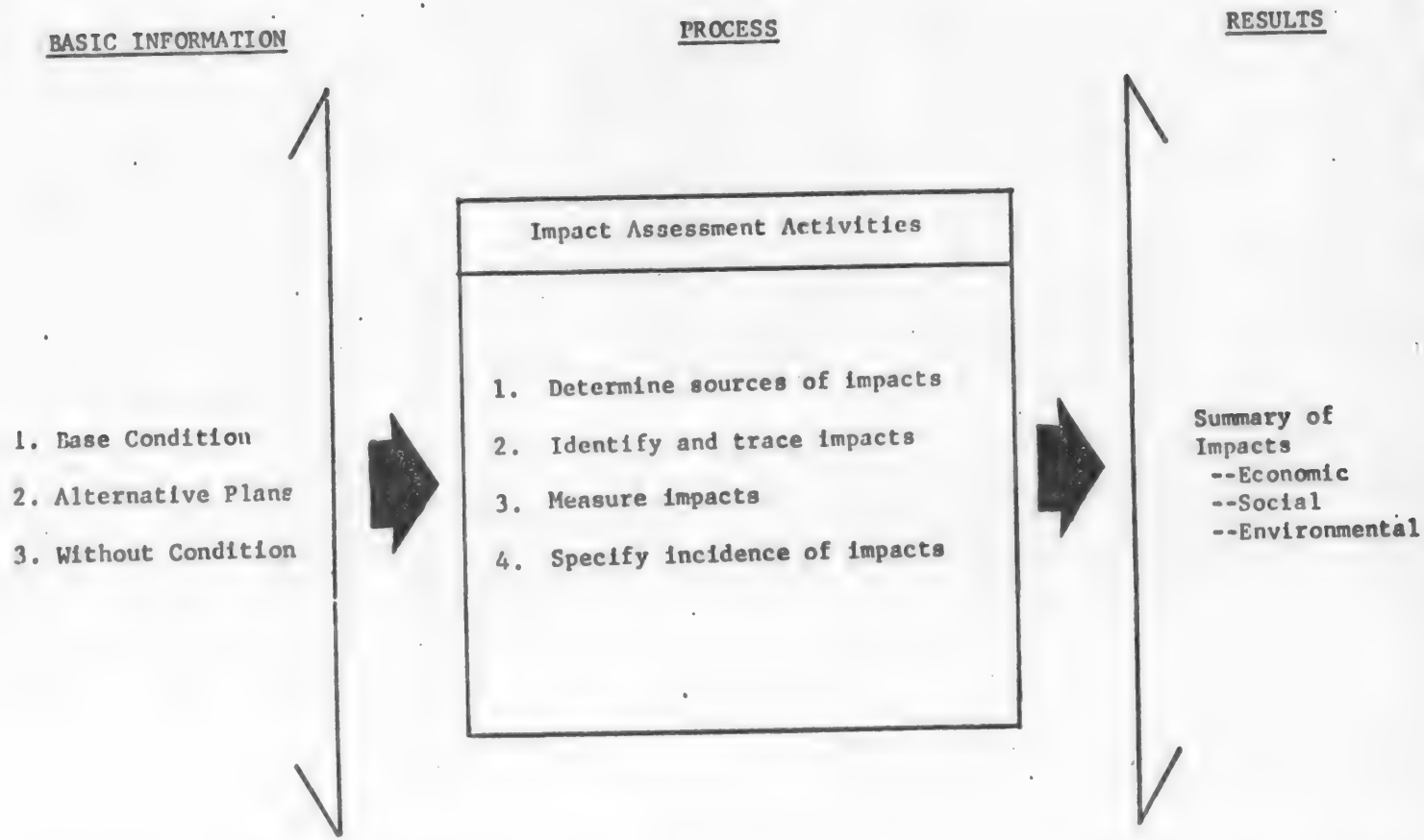

Figure 1: Impact Assessment

§ 294.7 Determine sources of impacts.

Each alternative and its component measures should be analyzed to determine potential sources of impacts. Impacts can be caused by the inputs required to carry out a measure, by the measure itself, or by the outputs resulting from it. Inputs generally include the natural resources, energy, labor, and capital that are necessary to implement a proposed management system. Outputs are the services or products such as water supply, recreation, flood control, open space, historic preservation, and the like, delivered by the plan, specified in terms of quantity and, if appropriate, quality. During this activity, particular attention must be given to identifying and categorizing all relevant sources of impact, especially in terms of the inputs and outputs associated with the measures. The information surfaced during this activity, specified by type, location, and size, forms the basis for assessment. Appendix A provides a suggestive source list of causative factors.

§ 294.8 Identify and trace impacts.

For each alternative plan, compare its inputs, measures, and outputs to the "without condition" to determine whether a change can be forecasted as a consequence of the plan. This requires tracing each cause to determine all of its significant impacts. Appendix B provides an illustrative listing of impacts which could occur. In most instances, the analysis will require tracing out an intricate network of causes and impacts to the extent practicable. Tracing out causes and impacts should be tempered so that only significant impacts are ultimately considered. Cause-impact analysis should surface all significant changes.

(a) Significance is established by determining if an impact could have a material bearing on decision making. Care must be taken to include necessary information on the one hand, but to avoid overloading the process on the other. The scarcity, fragility, or resiliency of the resources of the study area must also be considered in establishing the significance of impacts. Even though impact assessment is essentially an objective undertaking, determining whether an impact is significant or not must also reflect publicly held values.

(b) Identifying impacts should also reflect that an alternative plan or component measure thereof may not result in changing the "without condition". If no change from the "without condition" is projected, its significance should also be analyzed and the lack of change should be reflected in the subsequent assessment activities. It is particularly important for the analysis to specify instances when no net change occurs, especially in cases where the combined use of two measures, such as a dam and a fish ladder, produces a different impact than that which would otherwise be expected if only one of the measures were involved.

§ 294.9 Measure impacts.

This activity involves describing the magnitude of each change that has been identified. This is a difficult task, since many of the changes can be described only in a highly qualitative manner. This is particularly the case for environmental and social impacts. An attempt to measure all significant impacts, even those of a less tangible nature, will be made. Initially, the change expected to occur between the "without condition" and the base condition will be determined. Then, the change expected to occur between the "without condition" and the base condition will be determined. Finally, the difference between the "with condition" and "without condition" changes will be determined. This difference between the "with condition" and "without condition" is the impact of the plan and will be used in the subsequent evaluation task. Impacts should be described in an appropriate unit of measure or concisely characterized in a written statement. Over-dependence on abstract numerical measurement of impacts is likely to result in misleading information.

§ 294.10 Specify incidence of impacts.

The location, timing, and duration of each significant impact should be determined. These requirements are described below and defined in Part 393 of this chapter.

(a) Impacts should be described to establish their effect on the region, and on the nation as a whole, consistent with the System of Accounts tables prepared for the study (see § 393.20, of this chapter).

(b) The timing of impacts should be identified to establish whether they are likely to occur during implementation of the plan, shortly after implementation, or in a longer time frame.

(c) The duration of impacts should be identified to establish whether they are reversible or irreversible and whether they are short-term or long-term.

§ 294.11 Effective date.

This regulation is effective January 1, 1979. The provision of § 290.12 of this chapter are applicable to this regulation.

Appendix A—Sample Causative Factors

In order to identify and determine the impacts of a project, describe aspects of the project in terms of factors likely to produce significant impact. Impact assessment should not be carried out in greater detail than the alterative measure being considered. The list below is illustrative. It is not to be considered complete or limiting.

INPUT FACTORS

Natural Resources:
- Water
- Land
- Resources Products:
  - Gravel, Sand, Coal, Timber, Crushed Rock.
- Wildlife and Fish
- Aesthetics
- Flora (Plantlife)

Energy Resources
Capital
Labor

SYSTEMATIC FACTORS

Physical Alterations:
- Channelization
- Excavation
- Dredging
- Draining

Structures:
- Dam/Lake
- Levee
- Jetty
- Channel
- Barrier
- Road and Utility Relocation

Institutional:
- Acquisition
- Easements
- Relocation

OPERATION AND MAINTENANCE FACTORS

Equipment Service
Resource Management:
- Harvesting
- Planting
- Buffer Zone Maintenance
- Grazing
- Fencing

Maintenance:
- Recreational Areas
- Water Quality Protection
- Dredging Operations
- Navigation Controls
- Reservoir Controls and Procedures

OUTPUT FACTORS

Hydro-Power
Flood Control
Navigation
Water Supply
Recreation
Irrigation
Fish and Wildlife
Water Quality
Shoreline Protection

Appendix B—Sample Project Impacts

All significant impacts of a measure should be identified and assessed. In some cases, a causative factor may result in only one significant impact. In other cases, the significant impacts of a causative factor will be numerous and may require consideration in all three impact categories. (Example: A causative factor such as dredging may result in turbidity in the water for a brief period. This should be considered a predominantly environmental impact. Yet, because of the turbid water, a textile factory downstream may have to close down for a few days. This is an economic impact, and should be considered as a result of dredging even though it is a lesser impact than the environmental one. The increased turbidity may also have the effect of reducing water recreation temporarily. This is a social impact of dredging.) Judgment must be used as to the limits of tracing out impacts. Generally, the degree of detail involved in assessment should be no greater than that of the plan it addresses.

An asterisk denotes items specifically mentioned in section 122. These must be identified and evaluated. If they are considered to be significant, that should also be noted. Other impacts should be identified and evaluated only if they are considered to be significant. The list below is an illustrative one. It is not to be considered complete or limiting.

SOCIAL IMPACTS

*Noise
Population, e.g.:
  Mobility
  Density
  *Displacement of people
*Aesthetic values
Housing
Archeologic remains
Historic Structures
Transportation
Education opportunities
Leisure opportunities (recreation, active and passive)
Cultural opportunities
*Community cohesion
*(Desirable) community growth
Institutional relationships
Health

ECONOMIC IMPACTS

National Economic Development
Local government finance, e.g.:
  *Tax revenues
  *Property values
Land use
*Public Facilities
*Public services
Local/regional activity, e.g.:
  *(Desirable) regional growth
  Relocation
Real income distribution
*Employment/labor force
*Business and industrial activity
Agricultural activity:
  *Displacement of farms
  Food supply
National defense

ENVIRONMENTAL IMPACTS

*Man-made resources
*Natural resources
Pollution aspects:
  *Air:
    CO
    Sulphur oxides
    Hydrocarbons
    Particulates
    Photochemicals
  *Water:
    Pathogenic agents
    Nutrients N and P
    Pesticides, herbicides, rodenticides
    Organic materials
    Solids, dissolved and suspended
  Land: Soils
Animal and Plant:
  Birds
  Mammals
  Amphibians
  Fish, sport and commercial
  Shellfish
  Insects
  Microfauna
  Trees, shrubs and plants
  Microflora
Ecosystems:
  Habitats
  Food chains
  Productivity
  Diversity
  Stability
Physical and Hydrologic aspects:
  Erosion
  Erosion and sediment effects
  Compaction and subsidence
  Slope stability
  Groundwater regime and alteration
  Surface flow effects
  Micrometeorological effects
  Physiologic changes (e.g., wetlands destruction)

PART 295—EVALUATION (ER 1105-2-250)

Sec.
295.1 Purpose.
295.2 Applicability.
295.3 References.
295.4 General.
295.5 Period of analysis and interest rate for evaluation.
295.6 Appraise planning objective fulfillment.
295.7 Appraise system of accounts contributions.
295.8 Apply specified evaluation criteria.
295.9 Perform Trade-off analysis.
295.10 Designate the NED plan and the EQ plan.
295.11 Procedure to be followed when reiterating planning tasks.
295.12 Effective date.

AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Resources, 38 FR 24778-24869, September 10, 1973.

§ 295.1 Purpose.

This regulation provides guidance on the evaluation of alternative plans in multiobjective planning, consistent with the Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPA), and related policies.

§ 295.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 295.3 References.

(a) ER 1105-2-180, Wastewater Collection and Treatment Policy (33 CFR Part 275).
(b) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290).
(c) ER 1105-2-210, Plan Development stage (33 CFR Part 291).
(d) ER 1105-2-230, Formulation of Alternatives (33 CFR Part 293).
(e) ER 1105-2-240, Impact Assessment (33 CFR Part 294).
(f) ER 1105-2-921, System of Accounts (33 CFR Part 393).

§ 295.4 General.

Evaluation involves determining the beneficial and adverse contributions of each alternative plan. In evaluation, the impacts of each alternative and the impacts of the "without condition" are compared to determine the value of the contributions each plan would make when compared with what would happen in the absence of carrying out any of the plans. Then the relative contributions of the alternative plans are ranked and traded-off based on professional analysis and the perceptions of the public. At the conclusion of the planning process, the results of the evaluation provide the basis for selecting the most desirable plan and, if appropriate, recommending its implementation. A System of Accounts which will be used for displaying the results of this activity throughout a study, is discussed in Part 393 of this chapter. The evaluation task is depicted in Figure 1. Sections 6 thru 10 of this chapter discuss the activities included in evaluation.

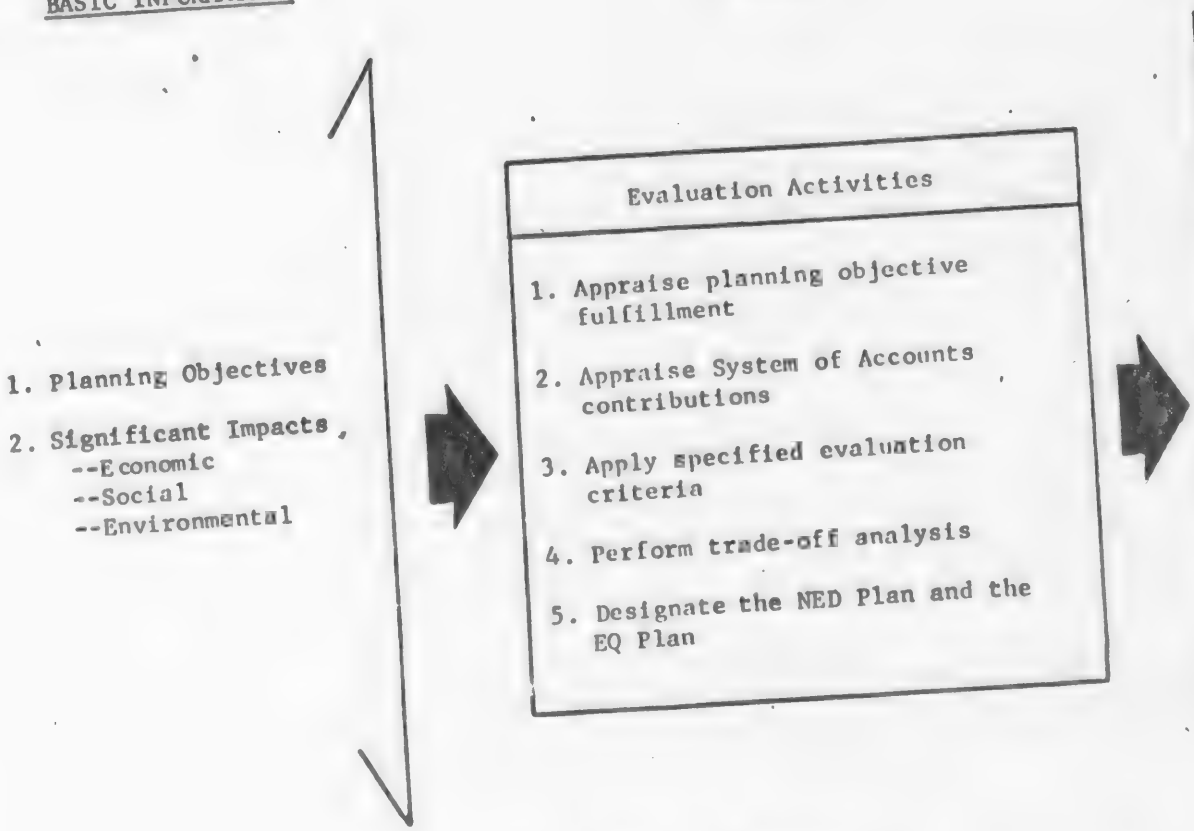

Figure 1: Evaluation

§ 295.5 Period of analysis and interest rate for evaluation.

(a) A 100-year period will be used for evaluation of major reservoirs, main line agricultural levees, local flood control in urban areas, and hurricane protection. A 20-year period will be used for cost-effective analysis of wastewater collection and treatment facilities (see part 275 of this chapter). The period of analysis to be used for economic evaluation of nonstructural measures shall be no longer than 100 years. A 50-year period of analysis will be used in all other cases. The period of analysis used for evaluation, however, will in no case exceed the estimated useful life of the measures being evaluated.

(b) Interest rates for evaluation are established annually by the Water Resources Council. Guidance on interest rates is published annually by DAEN-CWP in an engineer circular, following publication of the new rate in the FEDERAL REGISTER.

§ 295.6 Appraise planning objective fulfillment.

The first evaluation activity is to determine the relationship of the impacts of alternative plans to the planning objectives. Establishing the extent to which alternatives satisfy the objectives involves comparing the impacts of the plans and making a subjective judgment regarding the degree of satisfaction. Subjective judgments must reflect both professional analysis and public perceptions about how well the planning objectives are addressed. The purpose of this activity is to provide information about objective fulfillment as a basis for redirecting subsequent iterations to recast the objectives or to consider different measures that more adequately address the objectives.

(a) The appraisal of planning objective fulfillment initially involves comparing the significant impacts, both intended and unintended, of each alternative plan to the planning objectives. If an impact is related to an objective, then the degree of objective fulfillment should be determined. Possible methods for accomplishing this are by establishing a scale and measuring objective fulfillment in relation to it, by describing the degree of fulfillment or by making a subjective ranking of fulfillment. Then the net effect of the alternative in relation to the objective will be established by aggregating the separate impacts and subjectively determining the extent to which a net beneficial or adverse contribution will be made by the alternative. This process will be repeated for all objectives on which the alternative plan impacts and subsequently for each plan until the net effect of each plan on all the planning objectives is established.

(b) One aspect of the appraisal is to distinguish between what could be actual or potential contributions of the alternatives. An actual contribution is one that will occur as a result of a plan either under the auspices of a governmental agency or through the normal working of the economic system. A potential contribution is one that requires additional positive action by another agency or entity. This identification of contributions is important for reiteration of the planning tasks (see § 295.11).

(c) Establishing the degree of net beneficial or adverse contributions does not necessary involve a numercal measure. When appropriate, numbers may be used in measuring contributions. However, many contributions may be expressed only in terms of ordinal differences such as "high, medium, or low" or in terms of net effects such as "beneficial or adverse". An overdependence on numerical relationships is not necessary, and may not be appropriate. Discretion must be exercised when using any form of depicting objective fulfullment.

§ 295.7 Appraise system of accounts contributions.

The significant impacts of each plan will be evaluated to establish the plan's contributions to the National Economic Development (NED), Environmental Quality (EQ), Regional Development (RD), and Social Well-Being (SWB) accounts of the Principles and Standards (P&S). In general, the process followed in appraising planning objective fulfillment will be repeated to accomplish this activity. Identifying contributions to the four accounts involves a wide range of uncertainties which should be specified quantitatively or qualitatively, including who gains or loses, locational incidence, and time of occurrence. Because they are especially critical to the efficacy of the overall planning process, unintended contributions should also be identified. If the unintended contribution is significantly beneficial, it suggests the existence of previously unidentified concerns that reformulation could potentially address more fully. However, if the unintended contribution is significantly adverse, further reformulation is indicated.

§ 295.8 Apply specified evaluation criteria.

The third evaluation activity involves applying specified criteria to the alternative plans to test their responsiveness. These criteria are: Acceptability, completeness, effectiveness, and efficiency, as explicitly stated in the P&S; and certainty, geographic scope, NED benefit-cost ratio, reversibility, and stability, which are derived from the first four.

(a) Acceptability of a plan is determined by analyzing its acceptance by concerned publics. A plan is acceptable if it is, or will likely be, supported by some significant segment of the public. However, during reiterations of the planning tasks, every attempt should be made to eliminate, to the extent possible, unacceptability to any significant segment ot the public.

(b) The completeness of a plan is determined by analyzing whether all necessary investments or other actions necessary to assure full attainment of the plan have been incorporated.

(c) The effectiveness of a plan is determined by analyzing the technical performance of a plan and its contributions to the planning objectives and to the System of Accounts.

(d) The efficiency of a plan is determined by analyzing its ability to achieve the planning objectives and NED and EQ outputs in the least cost way.

(e) The certainty of a plan is determined by analyzing in general terms the likelihood that if the plan is implemented the planning objectives and the contributions to the NED and EQ accounts will be attained.

(f) The geographic scope is determined by analyzing the relevancy of the geographic area encompassed by the plan; it must be large enough to encompass a full understanding of the problems and focused enough to make the proposed solutions effective.

(g) The NED benefit-cost ratio of a plan is determined by analyzing the economic benefits in relationship to the economic costs.

(h) The reversibility of a plan is determined by analyzing the capability, as public needs and values change or should unusual future circumstances so warrant, of restoring the partially or fully implemented plan to approximate the "without condition".

(i) The stability of a plan is determined by analyzing the range of alternative futures, data and/or assumptions which can be meaningfully accommodated within the recommended plan or minor modifications thereof. Greater stability generally indicates a more desirable plan.

§ 295.9 Perform trade-off analysis.

Subsequent to identifying the contributions of the alternative plans to the planning objectives and the System of Accounts and establishing their response to the specific evaluation criteria, trade-off analysis will be conducted to analyze the comparative contributions of the alternative plans. When this has been accomplished for each alternative, the resulting information should be compiled so that what is gained or foregone by choosing a given alternative over other alternatives is clearly set forth.

(a) To accomplish this activity, monetary units, numerical data, and qualitative information will be compared.

Monetary relationships are only one part of the trade-off analysis; major aspects of the analysis will involve the consideration of qualitative information regarding the social and environmental values of each plan. Although more difficult to analyze, this information must be considered equally with the more tangible economic and engineering data.

(b) Trade-offs will involve subjective judgments and must therefore reflect public preferences. Through incorporation of public inputs, the trade-off analysis should surface the alternative or alternatives which appear to be the most acceptable to major segments of the public.

§ 295.10 Designate the NED Plan and the EQ Plan.

The alternative plans which appear to best meet the criteria for the NED Plan and the EQ Plan (as stated in Part 293 of this chapter) should be designated as a basis for subsequent iterations. This requires analyzing the overall economic and environmental contributions of each alternative when compared to the "without condition." The plans that result in the maximum net economic return will be candidates for the NED Plan. The plans that emphasize environmental contributions and, at a minimum make net positive contributions to the EQ account, will be candidates for designation as the EQ Plan. If it is impossible to designate an EQ Plan that meets the specified criteria, the plan least damaging to the environment will be identified. (See Part 293 of this chapter for further guidance.) The designation of the NED Plan can be made based on analysis of the economic returns to each alternative. The designation of the EQ Plan is subjective and must reflect societal preferences for the environmental contributions of the alternative plans. The NED Plan and the EQ Plan could be similar in certain instances where both sets of criteria are met by the same measures.

§ 295.11 Procedures to be followed when reiterating planning tasks.

The results of each iteration of the planning tasks will be analyzed to establish the necessity for or direction of the next iteration. If reiteration is to be undertaken, it will be necessary to establish which plans will be carried forward and the criteria that will be applied to their reformulation. This determination will be based on the results of the evaluation activities and the public's perceptions of the alternatives. Generally, reiteration will be undertaken for three reasons. Principally, reiteration will be undertaken to develop more precise and detailed plans that more fully address the planning objectives within the constraints of the study. Secondly, reiterations will be undertaken to attempt to reduce the significant adverse economic, social, and environmental impacts of the alternative plans. And thirdly, reiterations may be undertaken to increase the RD and SWB benefits of alternative plans, only in those specific cases when prior approval from the Secretary of the Army has been obtained.

(a) For all alternatives to be carried through to the next iteration, the specificity of the plans should be increased. This is accomplished by more precisely defining the planning objectives and by more fully exploring the range of means for addressing them. In addition, reiterating the planning tasks should be directed toward changing "potential" benefits into "actual" benefits, as well as reducing the uncertainties associated with the alternative plans. The following criteria will be applied to the reformulation of alternatives designated as the NED Plan and the EQ Plan, including those plans which address a mix of the two national objectives:

(1) For the alternative designated as the NED Plan, add new measures or modify or delete those already employed to develop a plan which is fully implementable and represents the best plan that can be formulated on the basis of economic criteria alone. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net NED benefits by analyzing the incremental benefits and costs of each measure and by making appropriate adjustments.

(ii) Without reducing the level of net NED benefits, attempt to increase net EQ benefits taking into consideration the full range of EQ costs.

(iii) Without reducing the level of either net NED or EQ benefits, seek the best combination of SWB and RD benefits possible.

(iv) Reduce adverse effects on RD and SWB to extent possible without incurring unreasonable losses in net NED or EQ benefits.

(2) For the alternative designated as the EQ Plan, add new measures, or modify or delete those already employed, to develop a plan which is fully implementable and represents the best plan that can be formulated on the basis of environmental criteria alone. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net EQ benefits, taking into consideration the full range of EQ costs.

(ii) Without reducing net EQ benefits or incurring additional EQ costs, attempt to increase the net NED benefits.

(iii) Without reducing either the net EQ or the level of net NED benefits, seek the best combination of SWB and RD benefits possible.

(iv) Reduce adverse effects on RD and SWB to extent possible, without incurring unreasonable losses in net NED or EQ benefits.

(3) For the alternatives that address a mix of the two national objectives, add new measures, or modify or delete those already employed, to develop plans which can be fully implemented and represent a viable mix of NED and EQ. To accomplish this, the following should be carried out in sequence during the subsequent formulation activity:

(i) Attempt to increase net EQ and/or net NED benefits.

(ii) Without reducing the level of either net EQ or net NED benefits, achieve the best combination of SWB and RD benefits possible.

(iii) Reduce adverse effects on RD and SWB to extent possible without incurring unreasonable losses in net NED and EQ benefits. This means that net EQ or NED benefits may be reduced to offset adverse RD or SWB effects only when the NED or EQ cost incurred, or benefits foregone, are less than the RD or SWB adverse effects reduced.

(b) As stated above, and discussed more fully in Part 291 of this chapter, positive RD and SWB effects can only be pursued when specifically approved by higher authority.

(c) When significant adverse impacts cannot be avoided, reiteration should surface viable mitigation measures. Mitigation will always be based on adverse impacts; that is, change measured from the "without condition". When mitigation is necessary, the following action must be taken:

(1) For significant water-related adverse impacts which cannot be eliminated by further planning iterations, consider mitigation actions based on the Corps' initiative rather than waiting to respond to technical questions or concerns raised by another public entity. This action is required by § 294.8 of this chapter.

(2) For significant non-water related adverse impacts outside the normal range of Corps' planning, assistance from other Federal, State and local agencies is to be sought regarding pertinent means to address or mitigate the adversity in question.

§ 295.12 Effective date.

This regulation is effective January 1, 1979. The provisions of § 290.12, of this chapter, are applicable to this regulation.

PART 393—FEASIBILITY REPORTS: SYSTEM OF ACCOUNTS (ER 1105-2-921)

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AUTHORITY: Water Resources Council, Principles and Standards for Planning Water and Related Land Resources, 38 FR 24778–24869, September 10, 1973.

§ 393.1 Purpose.

This regulation provides guidelines for reporting the results of evaluating alternative plans, consistent with the requirements of the WRC Principles and Standards (P&S), The National Environmental Policy Act of 1969 (NEPA), and related policies.

§ 393.2 Applicability.

This regulation is applicable to all OCE elements and all field operating agencies having Civil Works responsibilities.

§ 393.3 References.

(a) ER 1105-2-200, Multiobjective Planning Framework (33 CFR Part 290).

(b) ER 1105-2-220, Problem Identification (33 CFR Part 292).

(c) ER 1105-2-240, Impact Assessment (33 CFR Part 294).

(d) ER 1105-2-250, Evaluation (33 CFR Part 295).

(e) ER 1165-2-6.

(f) EM 1120-2-112.

§ 393.4 Function of the system of accounts.

The System of Accounts (SA) is a display requirement of the P&S and is integral to the iterative planning process established by section 393.3(a). The SA has two primary functions: First, the final SA displays the significant beneficial and adverse impacts of alternative plans for the purpose of trade-off analysis and decisionmaking. Second, interim SAs can be effectively used at the end of each iteration to display the information developed to that point and to determine what is still to be accomplished. Thus, the SA is prepared with increasing refinement and detail as the study progresses.

§ 393.5 General.

The SA can display only a limited amount of the information derived during the planning process. Therefore, the interdisciplinary planning team will be allowed considerable latitude in the format and level of detail of the SA. Most of its content results from the evaluation or significant impacts. Thus, only significant beneficial and adverse contributions will be displayed. In addition, the SA must describe each alternative carried through Stage 3; display the planning objectives; present each plan's performance against the specified evaluation criteria, i.e., indicate the timing, geographical, incidence, uncertainty, exclusivity, and actuality associated with the evaluation of significant impacts, as discussed in Part 295 of this chapter. Because the SA does not include all information, this ER does not affect display requirements established in other regulations. However, the SA satisfies the display requirements of section 122 guidance (see significant impacts indicated by an asterisk in Appendix B, Part 294 of this chapter.)

This regulation supersedes ER 1105-2-021. November 10, 1975.

§ 393.6 Suggested tables.

Although no rigid format is required, two suggested tables are presented.

(a) Table 1 will be general and brief. It will present the crucial and determinative factors that underly each final alternative and are relevant to plan selection. This table is intended for decision-makers and the general public. Therefore, it should be presented in the conclusions section of the main report.

(b) Table 2 will display the breadth and detail of the assessment and evaluation of final alternative plans. It will cover all significant impacts. This table is intended for reviewers and others who wish to determine the comprehensiveness of the planning and the trade-offs among plans. It should be presented in the evaluation section of the report.

ER 1105-2-921

Table 1 - Summary Comparison of Final Alternative Plans

	Base Condition (Designate Year(s))	Without Condition No action (Most Probable Alternative Future)	With Condition Plans		
			Plan A	Plan B	Plan N
A. Plan Description					
B Impact Assessment 1/ (Significant gross amounts, indicators and/or descriptions are to be shown for all conditions.) Re:					
Objectives NED					
EQ					
Accounts SWB					
RD					
C. Plan Evaluation 1/					
1. Contributions to Planning Objectives (The beneficial and adverse contributions of each plan to the planning objectives are to be listed.)					
2. Net (with vs. without) beneficial and adverse affects of each plan are to be shown.					
Objectives NED					
EQ					
Accounts SWB					
RD					
3. Plan Response to Associated Evaluation Criteria 2/					
4. Rankings of plan contributions (A thru N = 1 thru X) in relation to:					
Objectives NED					
EQ					
Accounts SWB					
RD					
are to be shown, and NED Plan and EQ Plan or the plan least damaging to the environment.					
D. Implementation Responsibility Federal, including both Corps and Non-Corps requirements, State, local, and private actions necessary to implement each plan are to be listed.)					

FOOTNOTE 1/ Significant impacts specified in Section 122 of PL 91-611 will be noted with an*, APP B ~~ER 1105-2-240~~. Part 294 of this Chapter

FOOTNOTE: 2/ Each plans' acceptability, completeness, effectiveness, efficiency, certainty, geographic scope, NED benefit/cost ratio, reversibility, and stability should be noted if useful in plan selection.

EP 1105-2-921

Table 2 - System of Accounts

Accounts	Plan A Plan Description	Plan B Plan Description	Plan N Plan Description	Footnotes
1. National Economic Development (NED)				
a. Beneficial impacts (specify separate benefits and source, if possible.)				
Location of Impacts (Incidence)				
(1) Value of increased outputs of goods and services. (2) Value of output resulting from external economies. (3) Value of output from use of unemployed or underemployed resources in construction or installation. (4) Total NED benefits.				
b. Adverse impacts (specify separate costs and source, if possible.)				
Location of Impacts (Federal-Local)				
(1) Project costs. (2) Losses resulting from external diseconomies. (3) Total NED costs.				
c. Net NED benefits.				
d. B/C ratio.				
2. Environmental Quality (EQ)				
Location of Impacts (Incidence)				
a. Environmental quality enhanced (specify resources impacted and quantify if possible designate rare and endangered species)				
b. Environmental quality destroyed (specify resources impacted and quantify if possible designate rare and endangered species.)				
3. Social Well-Being (SWB)				
a. Beneficial impacts (specify and quantify to extent possible)				
Location of Impacts (Downstream beneficiary, etc.)				
(1) Enhancement of health, safety, and community well-being. (2) Educational, cultural, and recreation opportunities. (3) Community cohesion maintained.				

Index of footnotes:

Timing

1. Impact is expected to occur prior to or during implementation of the plan.
2. Impact is expected within 15 years following plan implementation.
3. Impact is expected in a longer time frame (15 or more years following implementation.)

Uncertainty 1/

4. The uncertainty associated with the impact is 50% or more.
5. The uncertainty is between 10% and 50%.
6. The uncertainty is less than 10%.

Exclusivity

7. Overlapping entry; fully monetized in NED account.
8. Overlapping entry; not fully monetized in NED account.

Actuality

9. Impact will occur with implementation.
10. Impact will occur only when specific additional actions are carried out during implementation.
11. Impact will not occur because necessary additional actions are lacking.

Section 122

*. Items specifically required in Section 122 and App B in ~~EP 1105-2-460~~, Para 294, Chapter IV

1/ Easily reversible measures are desirable in cases where uncertainty of impact is high.

1. Impact is expected to occur prior to or during implementation of the plan.
2. Impact is expected within 15 years following plan implementation.
3. Impact is expected in a longer time frame (15 or more years following implementation.

Uncertainty 1/

4. The uncertainty associated with the impact is 50% or more.
5. The uncertainty is between 10% and 50%.
6. The uncertainty is less than 10%.

Exclusivity

7. Overlapping entry; fully monetized in NED account.
8. Overlapping entry; not fully monetized in NED account.

Actuality

9. Impact will occur with implementation.
10. Impact will occur only when specific additional actions are carried out during implementation.
11. Impact will not occur because necessary additional actions are lacking.

Section 122

*. Items specifically required in Section 122 and ~~EP 1105-2-460~~, Para 294 of Chapter IV

1/ Easily reversible measures are desirable in cases where uncertainty of impact is high.

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Table 2 - System of Accounts (Con't)

	Plan A Plan Description	Plan B Plan Description	Plan N Plan Description
Footnotes			
b. Adverse impacts (specify and quantify to extent possible)			
Location of Impacts (Project site, etc.)			
(1) Deterioration in quality of life, health, and safety. (2) Degraded educational, cultural, and recreational opportunities. (3) Injurious displacement of people and community disruption.			
4. Regional Development (RD)			
a. Beneficial impacts (specify separate benefits and source, if possible.)			
Location of Impacts (Area-Region)			
(1) Value of increased income. (2) Quantity of increased employment. (3) Desirable population distribution. (4) Increased stability of regional economic growth.			
b. Adverse impacts (specify separate costs and source.)			
Location of Impacts (Area-Region)			
(1) Value of income lost.			
(2) Quantity of jobs lost.			
(3) Undesirable growth.			

Index of footnotes:

Timing

1. Impact is expected to occur prior to or during implementation of the plan.
2. Impact is expected within 15 years following plan implementation.
3. Impact is expected in a longer time frame (15 or more years following implementation.)

Uncertainty

4. The uncertainty associated with the impact is 50% or more.
5. The uncertainty is between 10% and 50%.
6. The uncertainty is less than 10%.

Exclusivity

7. Overlapping entry; fully monetized in NED account.
8. Overlapping entry; not fully monetized in NED account.

Actuality

9. Impact will occur with implementation.
10. Impact will occur only when specific additional actions are carried out during implementation.
11. Impact will not occur because necessary additional actions are lacking.

Section 122

*. Items specifically required in Section 122 and ~~ER 1105-2-240~~. Part 944 of this chapter

§ 393.7 Final planning objectives displayed.

The SA will display each planning objective carried through the final iteration and the beneficial and adverse contributions thereto made by each alternative. Contributions will be indicated in essentially physical terms with considerable flexibility allowed the interdisciplinary planning team to choose an appropriate discriptive unit; e.g.

Planning objective	Contribution
Reduce flood hazard in area X.	Provides 100-yr level of protection.
Address long term irrigation needs.	Provides 100,000 AF.
Increase riverbank preservation.	Preserves 2 mi. of riverbanks.
Improve water quality of river X.	Increases water quality to a level suitable for swimming.

§ 393.8 Alternatives to be displayed.

While no specific number of alternatives is required for the SA, all alternatives carried through the final planning stage will be displayed in the final SA. This means that the National Economic Development (NED) Plan and the Environmental Quality (EQ) Plan, as well as other plans which meet significantly different mixes of NED and EQ, will be displayed. Resource management measures associated with each alternative should be presented in the Plan Description portion of Tables 1 and 2. In addition, although "no-action" may not be presented as an alternative plan, the "without condition," may be displayed in the SA to provide a point of reference and facilitate comparisons.

§ 393.9 Display of impact assessment.

Significant gross amounts and indicators will be presented for the "base condition," "without condition" and all "with plan" conditions (see Table 1). Emphasis will be placed on quantifying environmental and social impacts in an appropriate manner; e.g., acres of habitat, size of herd or flocks, number of trees, miles of shoreline, numbers of people and/or households directly affected (under each of the conditions); and/or brief but adequate descriptions of qualitative factors. Economic impacts will be quantified in dollar terms.

§ 393.10 Plan evaluation.

A summary of net beneficial and adverse effects, measured from the "without condition," will be shown for each alternative plan. This information, along with each plans response to associated evaluation criteria, will be used to determine the comparative rank of plans, from best to worst, and to designate the NED Plan and the EQ Plan(s) in accordance with criteria specified in § 295.10 of this chapter.

§ 393.11 Alternative futures.

The alternative future which reflects the "without condition" will be the basis for the SA display. There is no other SA display requirement associated with alternative futures. For further details on alternative futures see § 295.9 of this chapter.

§ 393.12 Section 122 requirements.

Section 122 specifies kinds of effects which must be assessed. These are discussed in Part 294 of this Chapter. These effects will be identified, assessed, and evaluated. If significant, they will be displayed in the SA. When displayed, they will be asterisked.

§ 393.13 Display of specified evaluation criteria.

Each plan's acceptability, completeness, effectiveness, efficiency, certainty, geographical scope, NED benefit/cost ratio, reversibility, and stability will be noted on Table 1, if critical to plan selection. Except for the NED benefit/cost ratio, most of these criteria will be useful primarily in the process of filling out the interim SA as part of the functional planning tasks. Therefore, for the final display, emphasis should be on brevity; the accompanying write-up may be used to expand on the display.

(a) *Acceptability.* For purposes of display, the planner should indicate whether or not the plan is supported by any significant segment of the local, state, or regional publics. In addition, strong opposition by a significant segment of the public should be noted.

(b) *Completeness.* A brief statement will be made as to which investments or actions necessary to obtain the outputs are not part of the plan. Notations "9", "10" and "11" (see § 393.19) will already have addressed the major aspects of completeness and further information will be supplied in relation to the "implementation responsibility" section of Table 1.

(c) *Effectiveness and efficiency.* These two related criteria center on the concept of achieving maximum net outputs, where outputs and inputs are conceived broadly to include intangible factors. Effectiveness includes, in addition, the concept of technological feasibility. All plans described in the SA should be the least costly way of achieving the outputs. It will be sufficient for display purposes to indicate that the plan is the least costly means of obtaining the outputs of that plan, where cost includes intangible costs, and that the plan is technologically feasible.

(d) *Certainty.* A brief statement will be made as to the likelihood of the contributions in the SA being obtained. Notations "4", "5", and "6" (see § 393.17) will already have addressed the major aspects of uncertainty.

(e) *Geographical Scope.* This criteria is closely related to the choice of study area. For final display purposes, indicate those areas beyond the study area whose problems are solved by the plan, such as, by interbasin transfers of water. In addition, where a report concerns only a portion of study authority area, this fact will be noted.

(f) *NED benefit/cost ratio.* This ratio will always be shown.

(g) *Reversibility.* A brief statement of the degree of reversibility will be made.

(h) *Stability.* A simple notation of "high," "low," and "medium" stability is sufficient. Since detailed analysis of each plan under each alternative future is not required, this criteria will usually involve considerable judgment. The concept of stability is also inherent in notations "4", "5", and "6". As a guide, plans which are highly sensitive to data or assumptions about which knowledgeable people might differ have low stability.

§ 393.14 Implementation responsibility.

Federal, including both Corps and non-Corps, state, regional, local, and private actions required to implement each plan are to be listed in Table 1.

§ 393.15 Use of footnotes in table 2.

Since the basic nature of the line items usually determines the timing, uncertainty, exclusivity and actuality of impacts, one footnote column containing 4-digit codes for the 4-footnote categories may normally be used. If major differences in impacts between plans are encountered, each entry (line and column) may be followed by the 4-digit footnote code.

§ 393.16 Timing.

The timing of an effect is a critical variable in plan formulation. Therefore, the SA provides for the following notations:

(a) A "1" will be used to designate impacts expected to occur prior to or during plan implementation.

(b) A "2" will be used to designate impacts expected in a short time frame. These will generally be impacts estimated to occur in 15 years or less after implementation of a plan.

(c) A "3" will be used to designate impacts expected in a long time frame. These will generally be impacts estimated to occur later than 15 years after implementation of a plan.

§ 393.17 Uncertainty.

The concept of uncertainty is a broad one. It encompasses two of the specified evaluation criteria, certainty and stability, discussed in § 295.8 of this chapter. A rigorous statistical analysis to establish certainty or stability is not required. As used in this

guidance, the concept represents a judgmental balancing of the following factors: The sensitivity of the impact on plan recommendation; the data limitations inherent in either the assessment or evaluation of the impacts; and limitations inherent in the theoretical framework or methodology. Based upon these factors, the following notations will be made recognizing that the percent designations are suggestive and are not intended to imply statistical rigor.

(a) A "4" will be used to designate that the level of uncertainty associated with an impact in the judgment of the analyst is greater than 50 percent. Many components of the regional account, and external economies and diseconomies will likely fall into this notation.

(b) A "5" will be used to designate an uncertainty range of 10 percent to 50 percent.

(c) A "6" will be used to designate an uncertainty range of 0 to 10 percent, thus suggesting that the impact is virtually certain.

§ 393.18 Exclusivity.

The components of accounts are not mutually exclusive. There are two major area where such non-exclusivity may distort the display of accounts.

(a) *Regional development (RD).* Regional components of the NED, EQ, and SWB accounts must sum to the national totals. This will avoid double counting of effects geographically.

(b) *Double classification of monetary and non-monetary effects.* Some contributions are dollar quantifiable but deserve special handling as non-monetary contributions as well. For example, while elimination of land scour due to flood flows can be quantified in dollars and counted as an NED benefit, it should also be included as a positive contribution to the environmental account since it improves the quality of land resources. Therefore, the SA provides for the following notations:

(1) The designation "7" will be used when the SWB, EQ or RD contribution has been fully monetized and counted as an NED beneficial or adverse contribution.

(2) The designation "8" will be used when the SWB, EQ, or RD contribution has been partially monetized.

§ 393.19 Actuality.

Many of the contributions of plans depends upon the actions of others. The SA will include notations indicating the proximity of cause between a plan and an impact. The following notation will be used in Table 2.

(a) A "9" will be used to designate that the contribution will likely occur without any action by any entity other than the proposed implementing agency, normally the Corps, or the required action is extremely likely to occur through the economic or natural physical systems.

(b) A "10" will be used to designate that the achievement of the beneficial contribution requires positive governmental action, other than cost sharing, by another agency. The adverse contribution associated with this action can and likely will be prevented by government action. This situation can be specified only when coordination indicates that the necessary action will be taken.

(c) An "11" will be used when coordination indicates that the action required by other agencies will not be forthcoming.

§ 393.20 Location of impacts.

The SA will describe geographical locations of any significant beneficial or adverse impacts. The Principles and Standards (P&S) require, as a minimum, that at least one region and the rest of the nation be shown. The locations suggested in the line items in Table 2 are examples of the likely geographical areas where impacts may occur. These areas are as follows:

(a) NED.

(1) Benefits are national, by definition. The localized incidence of these benefits should be shown here and/or in the Social Well-Being (SWB) account.

(2) Costs are Federal and/or local.

(b) EQ impacts are also national. The incidence of these impacts should be shown here. Particular attention should be given to endangered species, and migration routes and patterns.

(c) SWB.

(1) Benefits accrue primarily to needs centers. These beneficiaries may often be removed (downstream) from the sites of structural measures.

(2) Injuries in the form of displacement, deterioration, disruption, etc., would usually occur at or near construction sites.

(d) RD impacts may be in the form of indirect external economies and diseconomies (industrial diversification, agricultural over specialization, submarginal enterprise, etc.) that accrue to areas within the region under study. The region need not necessarily follow OBERS boundaries, but should be specified in terms appropriate to the planning situation. Double counting of NED impacts must be avoided.

§ 393.21 Components of accounts.

The P&S specifies components of accounts which will be considered in filling out the SA. Only components to which a significant contribution occurs will be displayed; other components need not be shown. Sub-categorization of the components displayed will be used to further specify the source and nature of the contribution (see Table 2).

§ 393.22 Content of national economic development (NED) account.

Since this account is filled out in dollar terms, brevity is emphasized. However, it should be complete in the sense that total dollar quantifiable benefits and costs will be displayed. Benefits and costs should be specified as average annual equivalents using the appropriate period of analysis and discount rate (part 295 of this chapter). Price levels will be those current at the time of the study, updated periodically according to existing practice. WRC Guideline No. 2, Agricultural Price Standards, October 1976, as updated, will be used for agricultural price levels. The components of benefits and costs in the NED account are discussed below:

(a) *Values of increased outputs of goods and services.* These are the benefits calculated under established Corps procedures for benefit/cost analysis. No change in existing guidelines are made in this regulation. However, recreation unit day values are increased by the P&S. It is important that the source of NED benefits be specified; e.g., "flood control"; "open space"; "fish and wildlife"; "water quality", and so forth. Note that many of the benefit sources are oriented toward environmental outputs. This is because such benefit sources are often partially quantifiable in the NED account. Undue detail as to the source of benefits is not necessary. For example, "flood control" is a sufficient designation of source; sub-designations such as "existing flood damages reduced", "reduction of fill costs"; and the like not needed for the SA.

(b) *Value of output resulting from external economies.* The NED benefits resulting form external economies, sometimes referred to as "indirect" or "secondary", are to be included in the NED account only in those cases where it can be positively shown that a net gain will accrue to the Nation. These benefits have not been widely used in evaluating Corps projects because of the empirical difficulty of separating national aspects of external economies from regional or local transfers. However, their validity is clear and any language to the contrary in EM 1120-2-112, Secondary Benefits in Flood Control Evaluation, is unintended. Even where net national secondary benefits will accrue due to the outputs of a Corps plan, such benefits are not attributable to the plan if the outputs would be obtained by an alternative means. Examples of such benefits are water supply and power.

(c) *Value of output from use of unemployed or underemployed resources in construction or installation.* This is a special category of benefits which relaxes the basic assumption of a "full employment" economy. As explained in the P&S, this component is concep-

tually an adjustment to the cost of a project because there is no economic cost associated with the use of an otherwise unemployed resource. The P&S elevates benefits to unemployed and underemployed labor resources to the same level as other NED benefits. This means that there will be only one NED benefit/cost ratio.

(d) *Project costs.* These are all inputs, measures at market value, required for plan implementation. The measurement of such costs is well established. Losses in land productivity, mitigation costs, and loss of recreation opportunities at the new unit day values will be included.

(e) *Losses from external diseconomies.* Such losses are measured in the same manner as computing the value of output resulting from external economies.

§ 393.23 Content of environmental quality (EQ) account.

Emphasis will be given to this account because, unlike the NED account, there is no common denominator readily available for comparing items within the EQ account. On the other hand, extensive listing of all perceived impacts may confuse rather than enlighten reviewers and the public. Hence, the challenge is one of providing an adequate, comprehensive display. One possible method is shown in Table 2, where the components of the EQ account are not the focus of the display; rather the focus is on the values of the impacts. The interdisciplinary planning team, reflecting public inputs and expert judgment, will indicate whether EQ is enhanced, degraded, or destroyed. Where there is no impact or where evaluation indicates that the impact is neutral or otherwise insignificant, no entry is made in Table 2 for the sake of brevity. However, in certain situations where there is no impact, the report will note the lack thereof (see Part 294 of this chapter). The judgment of the interdisciplinary planning team is based upon "with condition" and "without condition" analysis and the following definitions:

(a) *EQ enhanced.* The environment is enhanced if a greater quantity or improved quality of environmental outputs is obtained with a plan than without it. Often, so called "preservation" measures are actually an enhancement because without the plan the environment would be degraded or destroyed over time. Frequently, the same plan may cause both beneficial and adverse outputs. Beneficial outputs will be displayed under EQ enhanced; adverse impacts will be displayed under EQ degraded or destroyed. However, EQ enhanced should be limited, where appropriate, by some notion of an optimum quantity of the EQ output. For example, the amount of open space needed by a certain population size is the limit on the extent of EQ achieved by additional open space.

(b) *EQ degraded.* The environment is degraded if a lesser quantity or reduced quality of environmental output is obtained with a plan than without it. Nevertheless, the environmental loss could be made up by actions outside the plan or by natural processes over a period of time.

(c) *EQ destroyed.* In this case, environmental quality is reduced to the extent that it cannot be regenerated. Loss of a species of wildlife in a given area is an example. Pollution to the point where a river becomes anaerobic is another. While the line between degradation and destruction is rarely clear and precise, the distinction is important. "Irreversible commitments of resource to future uses" as specified by the P&S, will be a subcategory of the "EQ destroyed" category.

§ 393.24 Content of social well-being (SWB) account.

This account includes most of the benefits traditionally termed intangible under existing practice, especially for flood plain management plans.

(a) *General.* The following are the general requirements and considerations in filling out the SWB account in the SA.

(1) *Flood control.* Based on paragraph 6, page 15 of the WRC Principles, intangible flood control benefits will be considered in plan formulation, selection and recommendation. Such effect will be presented briefly in the SA under "Enhancement of health, safety, and community well-being", or comparable designation (see Table 2).

(2) *Adverse SWB.* Avoidance of adverse social contributions is a consideration of plan formulation. Beneficial contributions are treated in a much more constrained manner (see Part 295 of this chapter). Therefore, Table 2 divides social impacts into those which are beneficial and those which are adverse. Although social benefits are not taken into account fully at the project planning level, planners should recognize that beneficial contributions may be important at the national program planning and budgeting level. Therefore, to the extent practicable, planners are encouraged to provide estimates of social contributions, both benefical and adverse.

(3) *Monetary SWB.* Where a social contribution can be quantified (partially or totally) in dollar terms as a national benefit, it should be included as an NED benefit or cost.

(4) *Preferable entry.* In general, as with all intangible factors, the preferable entry is a meaningful, quantified notation of the beneficial or adverse contribution. However, lack of either study funds or data may necessitate a verbal, descriptive entry.

(b) *Specifics.* The following expands on that already specified in the P&S.

(1) *Effects on distribution of real income.* The beneficiaries of plans will be specified by family incomes into upper, middle, and lower third, based on the national average. At the planner's discretion, other classes of beneficiaries may be displayed for a given study, such as "farm", "urban", and so forth.

(2) *Effects on health, safety, and community well-being.* Generalized statements are to be avoided. If an impact is significant enough to be displayed, then it is important enough to be documented. This is particularly so where the contribution is used to formulate, select, or recommend a plan.

(3) *Effects on educational, cultural, and recreation opportunities.* These impacts generally can be shown as a function of mileage/time, distance, and numbers and kinds of population affected.

(4) *Injurious displacement of people and community disruption.* This category is recognized as a recurrent problem in many plans. The display should indicate the effect of measures taken to avoid such problems; for example, betterments, early sale and leaseback, town relocation, and the like.

(5) *Other.* The social category is a broad one and unique aspects may be involved in any given plan or element thereof. The "other" category is intended to insure that all social contributions of significance are included.

§ 393.25 Content of regional development account.

General comments above, concerning the social account, are applicable to this account as well. Impacts should be quantified if possible. Avoidance of unreasonable adverse impacts is a consideration of plan formulation; thus adverse and beneficial impacts should be separately displayed. Certain "regional" contributions other than transfers may be dollar quantifiable on a national basis, particularly for external economies and diseconomies. If quantified, such contributions belong in the NED account. The following expands on that already discussed in the P&S:

(a) *Regional EQ and SWB.* These components are redundant for the type of format used in Table 2, which calls for display of EQ and SWB components by regions. Hence, there is no need for a regional EQ or SWB component.

(b) *Regional income and employment.* This discussion applies to location effects on regional income in the RD account. It also applies to employment associated with such income. This information will be displayed whenever the public has indicated a strong concern regarding regional income and employment effects. How-

ever, display is inappropriate where a competent, professional job cannot be done due to lack of time and funds. The following considerations should be reflected in Table 2. First, only when a complete accounting of all direct and indirect effects of a plan on regional income can be accomplished will the RD account be summed. Second, a qualitative description should be used whenever the assessment is limited, thereby avoiding misleading quantification. Third, when the accounting is incomplete, an entry similar to the following will be included in the display: "All other regional income and employment—not evaluated." Fourth, the uncertainty associated with the effect will be noted. And fifth, nothing in the above limits the need for a full assessment and display of adverse impacts on employment, business, and industrial activity pursuant to Section 122 requirements (Part 294 of this chapter). The following categorization defines a complete accounting for a given region and explains items 4a (1) and (2) of Table 2:

(1) *NED net benefits.* These are directly derived from the NED account.

(2) *Direct expenditures.* These are the net increases in expenditures made within the region. For example, where there are recreation expenditures, they include purchases for motel accommodations, bait, repairs, and so forth which would not be made in the region in the absence of the alternative. Where there are construction force expenditures, they include the amount of wages spent in the region over and above those which would be made in the absence of the alternative. Such construction expenditures exclude wages to residents of the region.

(3) *Subsequent impacts.* This category includes expenditures made after the NED and direct expenditures. For example, a reduction in agricultural flood losses may mean that farmers have more income which can be expended on additional farm equipment or house furnishings; obviously farm equipment and furniture retailers will, in turn, have increased income to spend; and so forth. Such second and third round economic impacts are generally referred to as "multiplier" effects. Their measurement is especially difficult, particularly for small regions. These subsequent impacts will be separately shown. The Bureau of Economic Analysis (BEA), U.S. Department of Commerce, has developed some preliminary tools for the estimation of multiplier effects. Whenever a planner decides to display multiplier effects for an area in which BEA is capable of making an estimate at reasonable cost, the BEA data will be obtained; deviations will be explained. In addition, Water Resources Council (WRC), in conjunction with BEA, has developed a set of regional multipliers. They have been provided to the field for use in regional benefit analysis.

(4) *Induced economic activity.* Exclusive of NED benefits, benefits to induced activities are properly included in the regional account. Care must be taken to exclude those benefits already implicitly or explicitly included above.

§ 393.26 Uses of SA.

The SA is to be used as an aid to the planning process established in Part 290 of this chapter. It is used at the end of each iteration as a check upon the thoroughness of carrying out the planning tasks. Also, the SA will assist in defining the additional work necessary for the subsequent iteration. The following paragraphs indicate suggested specific uses of the SA in conjuction with the planning process.

(a) *Problem identification.* There are four suggested uses of the SA to facilitate planning for subsequent iterations:

(1) *Planning objectives.* The SA will assist the interdisciplinary planning team in observing when planning objectives have been overlooked, or are too numerous, general, or specific. When combined with the specified reformulation criteria, the SA provides a tool for honing or refining plans to insure that they are the best ones from an overall societal point of view.

(2) *Study area.* Using the SA to observe the location of significant impacts, the interdisciplinary planning team can determine whether the study area has been appropriately identified. This activity is directly related to the geographical scope evaluation criteria. As with most of the specified evaluation criteria, the greatest utility is to the ongoing planning process rather than to the final SA display.

(3) *Data gaps in base condition, projections.* When the information in the SA is soft or uncertain, and the impact is crucial to reaching a decision, a data gap has been surfaced which may be remedied on subsequent iterations. Where remedying the data gap is not feasible, sensitivity analysis of alternative futures is helpful. The SA notations "4", "5", and "6" and the certainty and stability evaluation criteria are directly related to this activity. In addition, a high degree of uncertainty may imply that a plan with greater reversibility is desirable.

(4) *Alternative futures, sensitivity analysis.* Analysis leading to the SA often involves assumptions, steps, techniques, or data about which knowledgeable people could differ. Hence, the SA will be used as a basis for checking the sensitivity of the analysis and data to the results. This activity is directly related to the certainty and stability evaluation criteria.

(b) *Formulation of alternatives.* The relationship between plan outputs and plan measures lies at the heart of reformulation criteria. In filling out the SA, opportunities for increasing net outputs should become apparent. Hence, the interdisciplinary planning team should try to increase the quantity and quality of outputs, decrease costs, or both. This is done by adding, deleting, or modifying measures and assessing and evaluating outputs to see if greater net outputs can be obtained.

(c) *Assessment and evaluation.* The display of the results of these two tasks are the main content of the SA. There are three major areas where the SA will assist in improving assessment and evaluation on the next iteration. These are:

(1) *Public input to evaluation.* Many of the impacts of a plan are viewed differently by various segments of the public and Corps planners. The SA provides a focus for periodic interaction with the public as to the values placed on outputs. In many cases this may change the evaluation during subsequent iterations.

(2) *Data gap in assessment.* The SA will surface data gaps in the assessment task. Thus, improved assessment should be sought on the next iteration. A similar statement can be made for evaluation.

(3) *Unintended effects.* One of the most productive uses of the SA lies in surfacing unintended impacts. For example, suppose plans are designed primarily for wastewater management. However, one plan uses small detention reservoirs, which also reduce flood problems. This impact will be noted in the SA. On reiteration, the potential of a system for joint outputs should be explored. Alternatively, significant unintended impacts may be adverse. In such cases, mitigation measures or revision of planning objectives is called for. For example, one solution to a flood problem may have adverse impacts on ground water recharge, not mentioned previously as a concern in problem identification. The interdisciplinary planning team should determine whether the lost recharge is serious, by professional analysis and public inputs. If it is serious, recharge ought to be incorporated into the planning objectives, thus directing attention toward solutions, including mitigation, which avoid loss of recharge.

§ 393.27 Effective date.

This regulation is effective January 1, 1979. The provisions of § 290.12 of this chapter are applicable to this regulation.

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